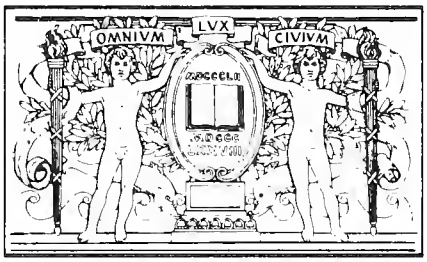

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August 13, 1987

Operations Division
Regulatory Branch
CENED-OD-R-24-87-912C

PUBLIC NOTICE

Massachusetts Water Resources Authority (MWRA), Charlestown Navy Yard, 100 First Avenue, Boston, Massachusetts 02129

has requested a Corps of Engineers permit under Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 to construct and maintain water transportation facilities to serve the proposed Boston Harbor Wastewater Facilities at Deer Island, Boston, Massachusetts.

The MWRA is currently performing engineering and environmental evaluations to plan, design, and construct a secondary wastewater treatment facility of approximately 500 MGD average capacity (approximately 1200 to 1300 MGD peak capacity) on Deer Island to serve the needs of the communities served by the MWRA.

The 1985 Environmental Impact Statement and the Environmental Impact Report on the siting of wastewater treatment facilities serving metropolitan Boston found that treatment facility construction traffic would have significant adverse impacts on neighboring communities. Those reports recommended the construction and use of pier facilities for the shipment of materials and workers to the treatment plant site. This is the initial activity for which a permit is being sought. The recommended facilities at Deer Island include a pier for roll-on/roll-off cargo and personnel ferries, and a bulkhead for bulk material cargo. At Nut Island the recommended option is a pier on the north side of the island to accommodate roll-on/roll-off cargo, bulk cargo, and a personnel ferry. Dredging would be required at both sites, and some fill would be required at the Deer Island site.

The proposed activity also includes the construction of separate roll-on/roll-off and personnel piers at on-shore sites. Roll-on/roll-off piers will be constructed at the General Dynamics shipyard site in Quincy and the Pier 48, 49 and 50 site in Charlestown. Neither of these sites will require dredging or filling. Pertinent data is summarized on Table I. On-shore personnel docking facilities will be located at the Blossom Street site in Lynn, the Marina Bay site in Quincy, the Hewitt's Cove site in Hingham, the Beverly Street site (adjacent to North Station) in Boston, and the Rowe's Wharf site in Boston. The Lynn and Quincy personnel sites are likely to require dredging, others will simply require the addition of floats to existing docking facilities. Activities at these five sites will be reviewed and permitted separately. See Sheets 24-28.

Due to construction scheduling constraints the permit for the Deer Island Wastewater Treatment Plant and associated facilities may be phased to allow construction of the water transportation facilities (piers, etc) to begin before plans for the treatment facility and residuals management program are complete. A summary and status of the secondary treatment facilities and residuals management are provided in Appendices A and B.

Final Engineering and Environmental Impact Reports have been completed for the Water Transportation Facilities and are available for review at the Boston, Winthrop and Quincy libraries and the MWRA offices. These reports include more detailed descriptions of the project and evaluation of anticipated impacts. The U.S. Environmental Protection Agency is preparing two Supplemental Environmental Impact Statements (SEIS). The first SEIS will address the construction of the pipeline/tunnel between Nut Island and Deer Island and the outfall tunnel/pipeline and diffuser. The second SEIS will address the disposal of sludge, scum and grit and screenings to be generated at the wastewater treatment facility.

WATER TRANSPORTATION FACILTIIES

Deer Island Site

The proposed activity at Deer Island is the construction of a combined personnel - RO/RO pier and shoreside bulkhead on the southwestern shore of the island, as shown in Sheets 1-8. The pier will be an open pile structure with piles placed approximately 7.5 feet on center. This structure will extend up to 540 feet seaward (perpendicularly from the shore) and will be 275 feet wide. The adjacent bulkhead will roughly follow the mean high water line (elevation +/- 10 feet above mean sea level) for 920 feet. This bulkhead will consist of steel sheet piling and tie rods anchored by deadmen. The bulkhead will be situated so as to minimize the amount of fill required, but must be located sufficiently offshore to not conflict with an existing outfall that runs parallel to the shore.

Dredging approximatley 150,000 cubic yards of sediment (over an area of approximately 86,000 square yards) will be required to make the nearshore area surrounding the proposed pier and bulkhead navigable. In addition, approximately 1,000 cubic yards of fill (over an area of approximately 800 square yards) will be required to raise the grade of two small intertidal zone inlets behind the propsed bulkhead.

Dredged material may be used as fill, but the use of material from excavation work required on Deer Island as part of the treatment facilities construction is also being considered. The 149,000 - 150,000 cubic yards of excess dredged material will be disposed of at the approved "Foul Area" in Massachusetts Bay. This EPA-approved interim site is a circular area with a diameter of 2 nautical miles and center at 42 -25.7'N, 70 -34.0'W. From the center, the Marblehead Tower bears true 282 at 24,300 yards and Baker Island Horn bears true 300 at 24,300 yards. Bioassay and bioaccumulation tests conducted at this site and at the proposed dredge disposal site indicated similar sediment conditions suggesting minimal adverse effects on the marine environment at the disposal site. The sediments at the proposed dredging site consist mainly of sand and silt containing low levels of contaminants.

A combination of backhoe and clamshell dredge on barges will be used to conduct the proposed dredging. Dewatering will not be necessary due to the highly permeable nature of the sediments. Excess dredged material will be transported directly to the spoil site by barge, so no temporary on-shore storage will be required.

Ten alternatives to the proposed pier location and configuration at Deer Island were carefully evaluated in the EIR for this project. The alternatives were not selected over the proposed activity based on prohibitively long construction schedules required and on potential obstructions to navigation.

One alternative to the proposed activity at Deer Island is considered feasible and is therefore presented in this application. This alternative action is the construction of a combined RO/RO - personnel pier with an adjacent bulk material handling pier (rather than a bulkhead) as shown in Sheet 7. The combined pier would be constructed in the same fashion, layout and dimensions as in the proposed activity, but would be located approximately 175 feet southeast of the proposed pier. The alternative bulk material pier would be located approximately 175 feet southeast of the alternative combined pier. The material pier would extend approximately 285 feet perpendicularly from the shoreline (parallel to the combined pier) and continue at a right angle to the southeast for another 300 feet. This pier would be approximately 75 feet wide, and would be constructed in the same fashion as the combined pier in the proposed activity (i.e.: open pile pier with piles 7.5 feet on center). No dredging or fill would be rquired for this alternative. Construction would begin on the same schedule as the proposed activity, but would likely require significantly more time to complete. The likelihood for a longer construction schedule as well as a more time consuming load - unload schedule operation for bulk materials make this alternative less favorable than the proposed activity.

The proposed dredging is scheduled to take place in October of 1989 and pier construction, particularly pile driving, is scheduled to begin in the winter of 1989. Pile driving equipment will be muffled to mitigate noise impacts. If necessary, silt curtains suspended from floating booms will be placed around the dredging area in order to minimize water quality (turbidity, suspended solids, etc) impacts.

Nut Island Site

The proposed activity at the Nut Island site is the construction of an open pile pier extending 410 feet seaward from the mean high water line. The pier would be 110 feet wide at its southern (landside) terminus and 30 feet wide at its northern terminus. Three fendering dolphins and an access bridge would be required to accommodate a roll-on/roll-off supply boat, as shown in Sheets 8 - 12. About 51,000 cubic yards of clay (covering an area of approximately 19,600 square yards) must be dredged to elevation -15 feet as part of this activity, but no fill is required.

A backhoe on a barge will be used for dredging at this site. Due to the firm, consolidated nature of the clayey sediments at this site, neither dewatering nor temporary storage will be necessary. All of this dredged material will be barged directly to and disposed of at the approved "Foul Area" in Massachusetts Bay. Bioassay and bioaccumulation studies have indicated that the sediments to be dredged contain minimal levels of contaminants and are suitable for disposal at the spoil area.

Seven alternatives to the proposed activity at Nut Island were carefully evaluated in the EIR for this project. These alternatives were not selected based on either obstructions to navigation or greater amounts of dredging required.

The proposed activity will occur on the same schedule as described under the Deer Island site. Pile driving equipment will be muffled, but silt curtains will not be required as the tight clay sediments are not likely to be significantly disturbed by dredging.

General Dynamics Site

The proposed activity at the General Dynamics Shipyard site in Quincy is the rehabilitation of the existing dock, construction of a new roll-on/roll-off pier and repair of an existing bulkhead. Seven dolphin and fendering units will also be required adjacent to the proposed dock, as shown in Sheets 13 - 17. No dredging or fill will be required.

The proposed pier extends 700 feet into the Weymouth Fore River and will be approximately 60 feet wide. The pier construction will be open piles, similar to that described under the Deer Island site. The pier is not expected to be an obstruction to navigation as it is an existing pier and will be located adjacent to several other piers of equal or greater length.

Construction is expected to be completed in May 1990. Pile driving equipment will be muffled. Silt curtains will probably not be required due to the nature of the proposed activity (no dredge or fill) and the existing sediments.

Piers 48, 49 and 50 Site

The proposed activity at the Piers 48, 49 and 50 site is the repair of about 1,200 linear feet of an existing bulkhead and the construction of two open pile RO/RO piers with accompanying access bridges and fendering dolphins (3 each), as shown in Sheets 18 -23. One RO/RO pier would extend parallel to Pier 48 for 170 feet with constant width of 65 feet. The other would extend 100 feet into the harbor at an angle from Pier 50; its maximum length along Pier 50 would be 200 feet. The access bridge and fendering dolphins would be situated adjacent to Pier 49 so as to minimize obstruction of navigation in the adjacent Mystic River Channel. The method of pier construction will be the same as described under the Deer Island site. No dredging or fill will be required.

The proposed activity is scheduled to occur on the same schedule as the General Dynamics site. Mitigation will include muffled pile driving equipment and silt curtains, if necessary.

Blossom Street Site

The proposed activity at the Blossom Street site (see sheet 24) is dredging around an existing docking facility and adding a float to this facility. The activity has previously been proposed by the Lynn Port Authority in its 1986 Coastal Facility Improvement Program Application. The proposed float will be 11.5 feet wide and will extend 80 feet seaward (perpendicular to the shoreline) directly from the end of the gangwy for the existing float. The proposed float will be held in place by four piles, two on each side. About 9,800 cubic yards of sediment will be dredged from nearshore areas adjacent to the docking facility. No fill would be required as part of this proposed action.

Marina Bay Site

The proposed activity at the Marina Bay site (see sheet 25) is the addition of a gangway and float system to an existing marina. A breakwater and channel dredging may also be required at this site.

Hewitt's Cove Site

The proposed activity at the Hewitt's Cove site (see sheet 26) is simply adding more personnel ferry trips in and out of an existing ferry terminal facility. No additional marine construction, dredging or fill would be required.

North Station Site

The proposed activity at the North Station site (see sheet 27) is placement of a pile-held float and a connecting gangway along an existing bulkhead at the terminus of Beverly Street. The float will be situated so that its length is parallel to the existing bulkhead from which the gangway will extend.

Rowes Wharf Site

The proposed activity at the Rowes Wharf site (see sheet 28) is simply adding more trips in and out of an existing ferry terminal facility. No additional marine construction, dredging or filling would be required.

Temporary Sand Barge Unloading Facility

One of the activities included in Early Site Preparation entails the excavation/removal of grit and screenings located on Deer Island, and disposal of these materials in a secure landfill which will be constructed on the southern end of Deer Island. The landfill design, described in the Early Site Preparation EIR/EID, Vol. VI, is in accordance with the sludge-only landfill design guidance of the Massachusetts DWPC, and includes a double liner and leachate collection. Construction of the leachate collection will require 17,000 cy yd of sand which must be transporated to Deer Island. To eliminate traffic impacts which would be associated with overland truck transport of the sand, it is proposed that the sand will be transported to Deer Island by barge. A temporary facility would be constructed on Deer Island which would allow for the off-loading of sand from the barges; a total of 20 barge trips will be required for delivery of the sand. The following summarizes the construction of the temporary sand barge off-loading facility.

The attached figures, Sheets A and B, provides plan and section views of the temporary barge off-loading area. An existing , unused rock wharf located on the western side of Deer Island and near the existing composting demonstration facility , will be used for this activity. Improvements to the wharf will be made, consisting of the following:

1. Two timber mooring dolphins will be placed, 20 ft from the existing rock wharf bulkhead.

2. Approximately 50 to 75 cu yd of sediment/rock debris will be dredged fron high spots located in front of the existing wharf. Dredging will be performed by a clamshell bucket from a crane deployed on top of the wharf. The dredged material will be temporarily stockpiled on the existing grit and screenings disposal areas; following the completion of the secure landfill liner/leachate collection system, the dredged material will be incorporated into the landfill.

3. Approximately 200 cu yd of 0.75 to 1.5 in diam. crushed stone will be placed and leveled at the base of the 140 ft by 40 ft barge moorings, as shown on the attached drawings.

Construction of the temporary barge off-loading area will be performed during the spring/summer of 1988, which will allow for timely completion of the grit and screening disposal in the secure landfill.

In order to properly evaluate the proposal, we are seeking public comment. Anyone wishing to comment is encouraged to do so. Comments should be submitted in writing by September 14, 1987. If you need additional information, please contact Ms. Karen Kirk Adams at the above address or by telephone at 617-647-8492, or use our toll-free line 1-800-343-4789 (use 1-800-362-4367 if calling within Massachusetts).

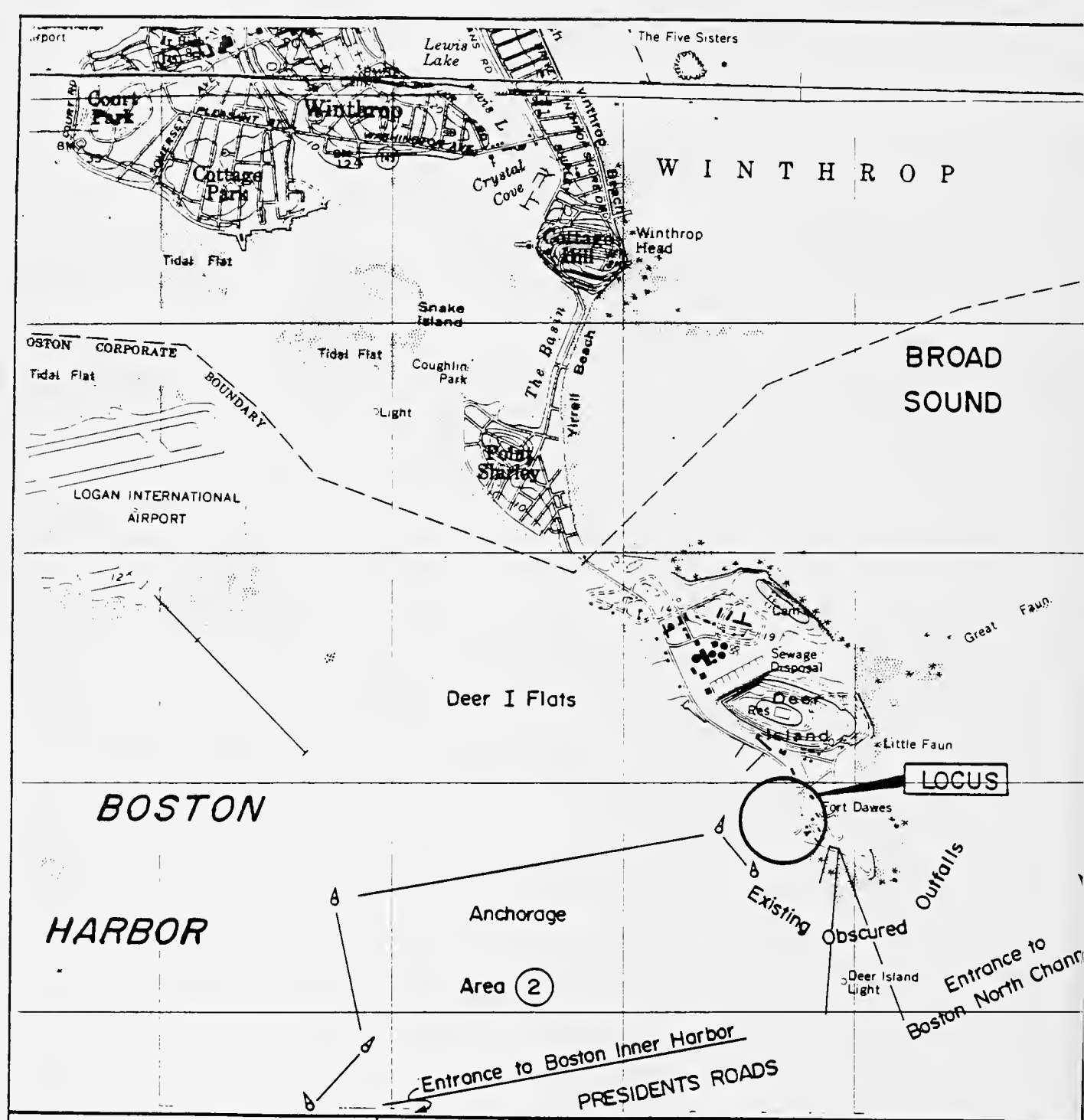
Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider the application. Requests for a public hearing shall specifically state the reasons for holding a public hearing. The Corps holds public hearings for the purpose of obtaining public comments, when that is the best means for understanding a wide variety of concerns from a diverse segment of the public.

Sincerely,

David H. Killoy, P.E., C.P.G.
Chief, Evaluation Section
Regulatory Branch
Operations Division

SEE REVERSE SIDE FOR
DETAILS OF EVALUATION
FACTORS

LOCATION	FILL AREA (sy)	FILL VOL (cy)	DREDGE AREA (sy)	DREDGE VOL (cy)	PIER ELEV	PIER LENGTH	PIER WIDTH	DOLPHINS	BULKHEAD	RO/RO BERTHS
DEER ISLAND	800	1000	86000	150000	16.0mlw	540	275	8	920 ft	2
NUT ISLAND	0	0	19600	51000	16.0mlw	410	110	3	no	1
GENERAL DYNAMICS	0	0	0	0	?	700	60	7	repair	1
PIERS 48,49,50	0	0	0	0	?	100	200	6	repair	2



PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

DEER ISLAND
PIER FACILITIES

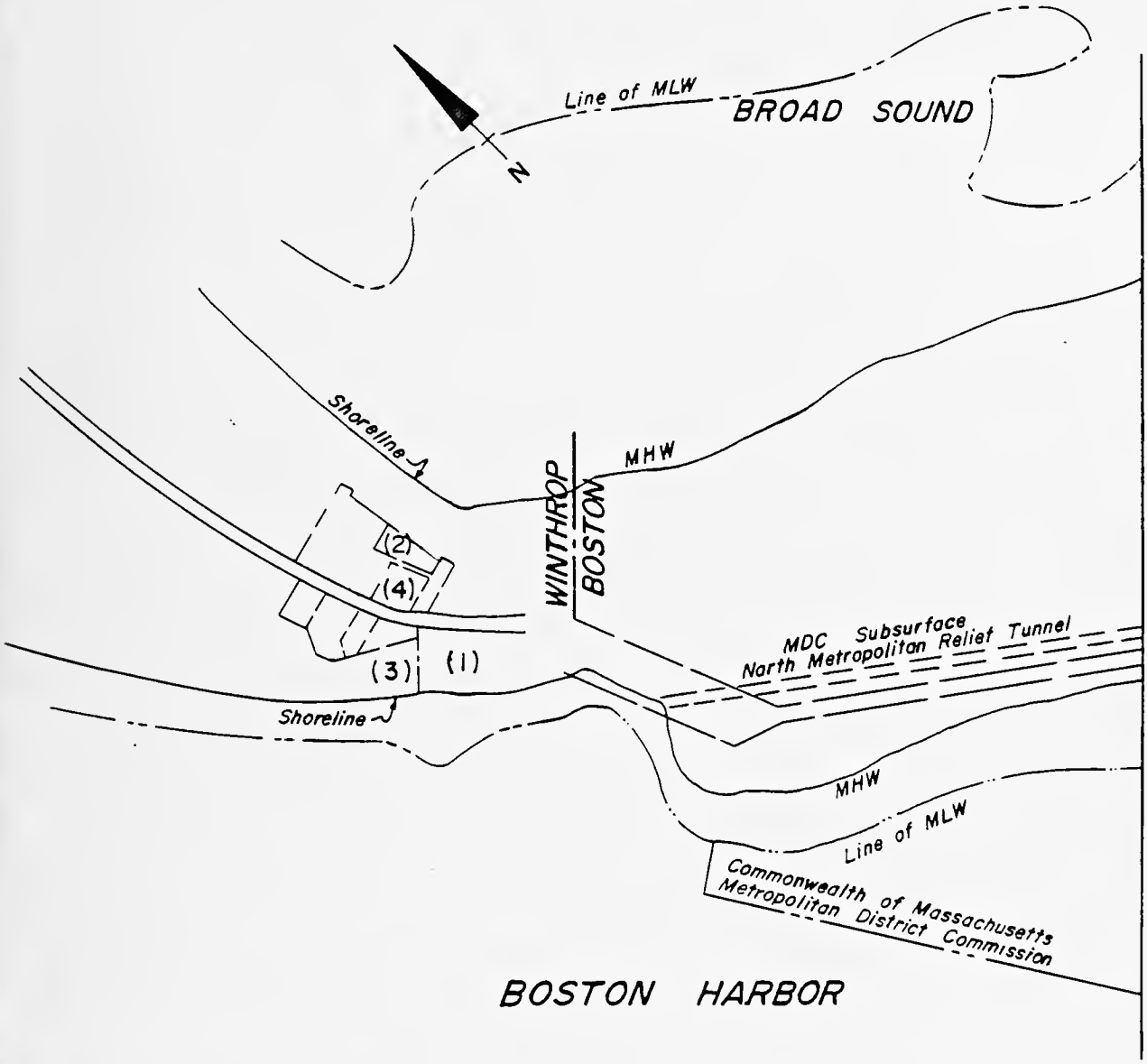
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 1 OF 28 DATE: MAY 19



OTE:
NUMBERS SHOWN THUS (14)
REFER TO PROPERTY OWNERS
LISTED ON ATTACHMENT B

RPOSE: TO CONSTRUCT A
ARINE PORT TO RECEIVE
TERIALS & WORKERS FOR
REATMENT PLANT
NSTRUCTION

ATUM : MLW = 0.0 FT.

DJACENT PROPERTY OWNERS:
SEE ATTACHMENT B

PLOT PLAN

400 0 400

SCALE IN FEET

PREPARED BY:
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Waltham, MA. 02254

DEER ISLAND PIER FACILITIES

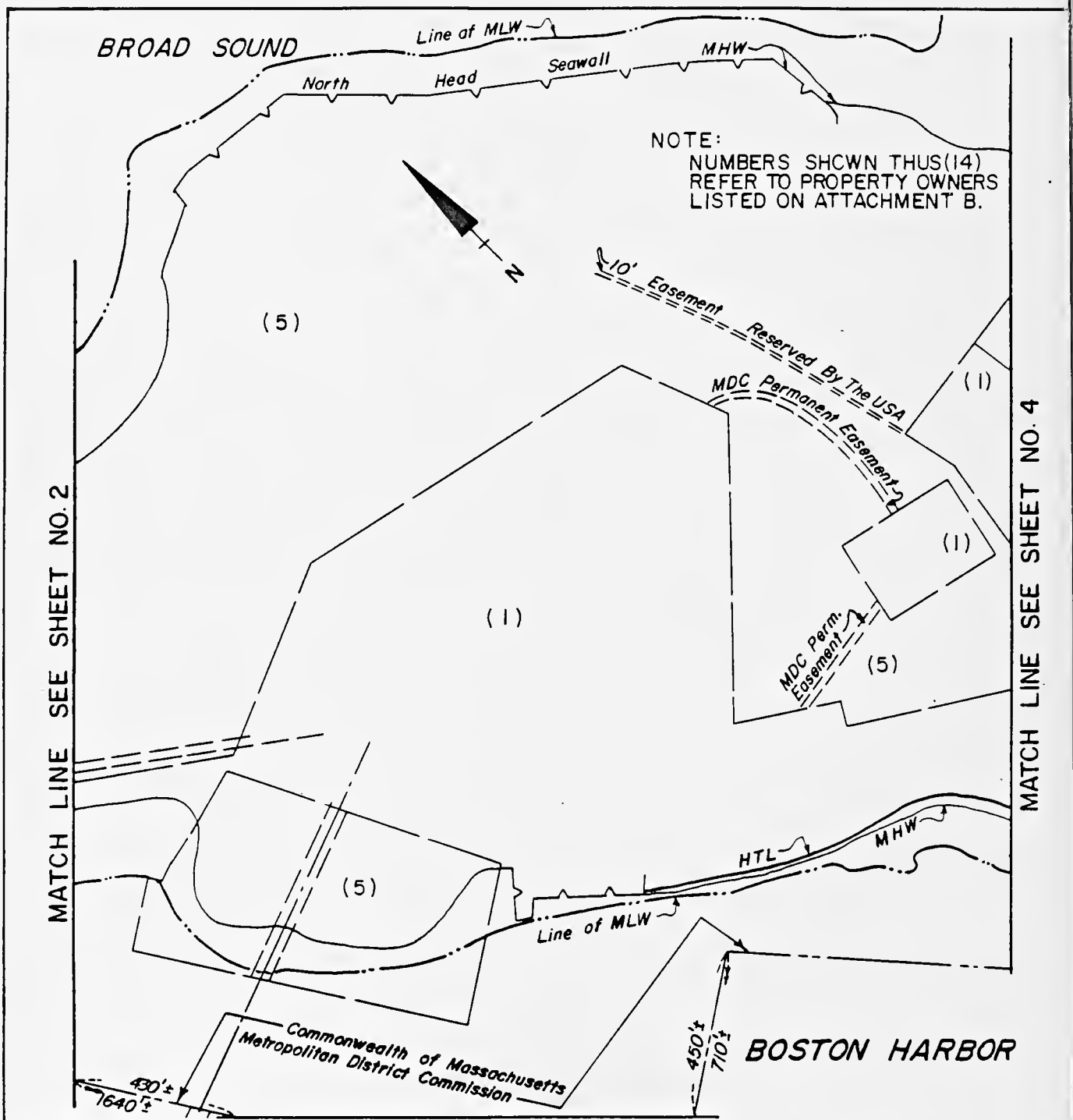
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 2 OF 28 DATE: MAY 1987



PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS

SEE ATTACHMENT B

PLOT PLAN

400 0 400

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

DEER ISLAND PIER FACILIT

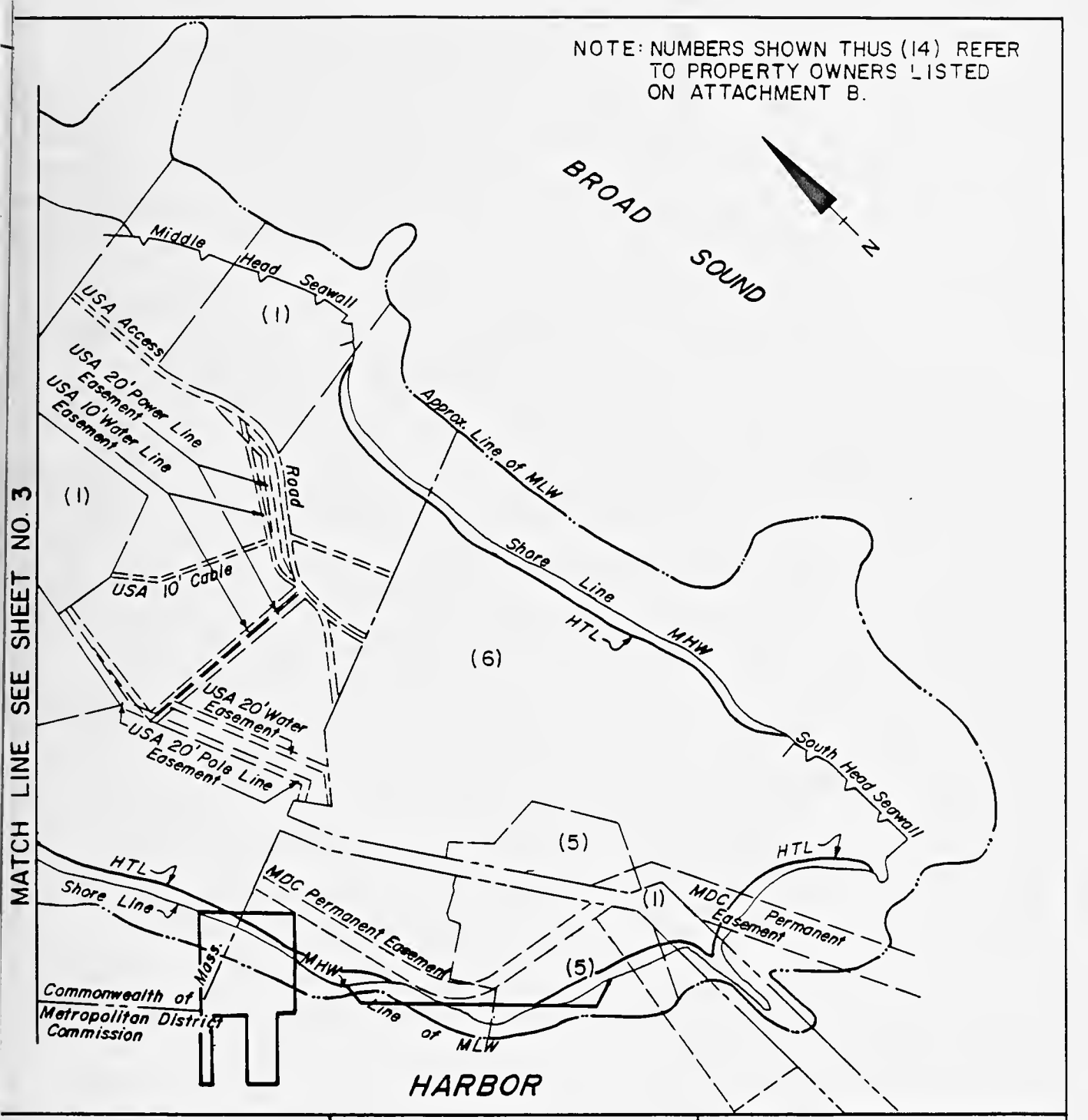
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 3 OF 28 DATE: MAY 19



RPOSE: TO CONSTRUCT A
RINE PORT TO RECEIVE
TERIALS & WORKERS FOR
EATMENT PLANT
NSTRUCTION

TUM : M L W = 0.0 FT.

JACENT PROPERTY OWNERS

SEE ATTACHMENT B

PLOT PLAN

400 0 400

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

DEER ISLAND PIER FACILITIES

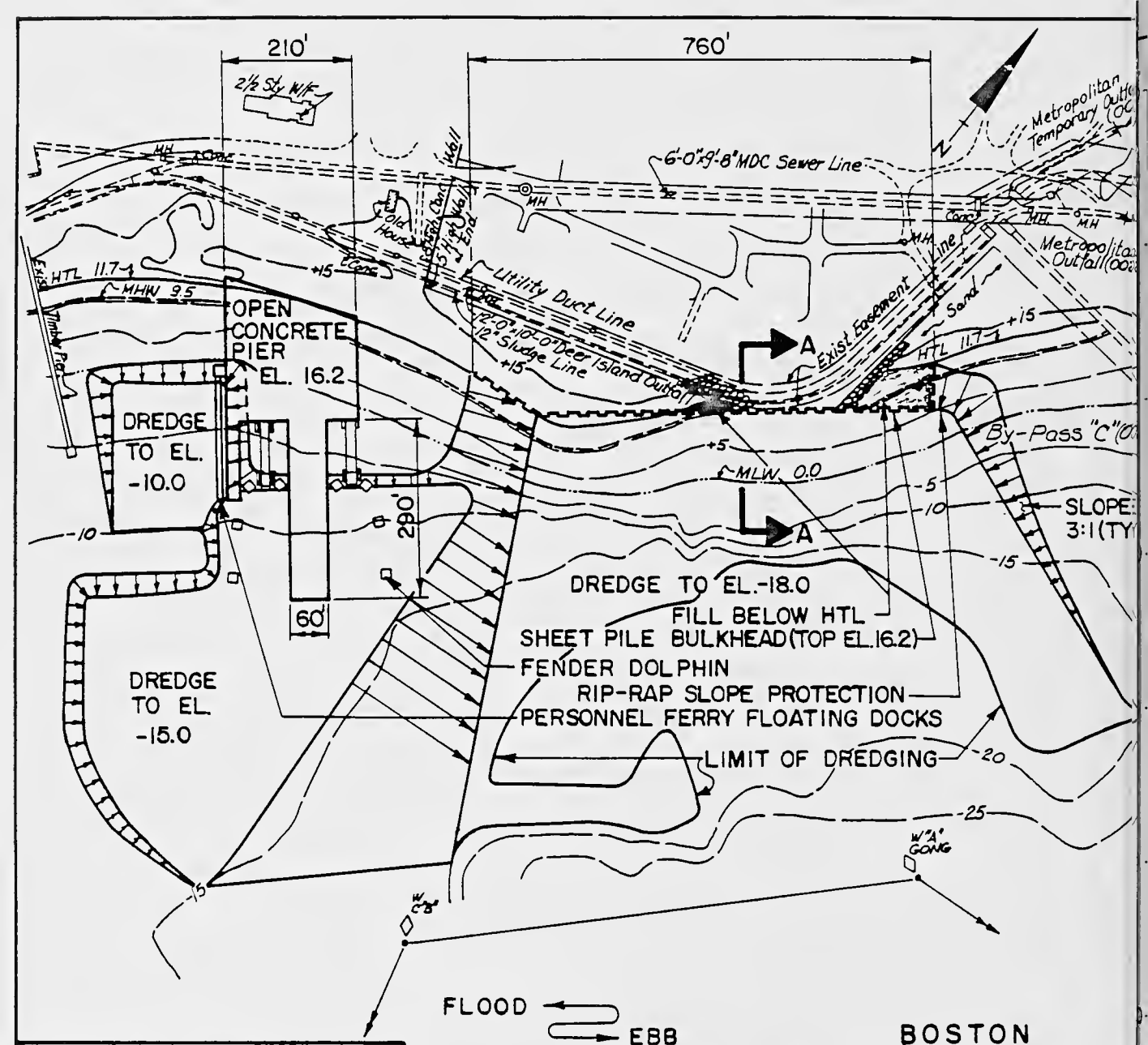
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 4 OF 28 DATE: MAY 1987



DREDGE QUANTITY APPROX. 150,000 C.Y.

FILL BELOW HTL = 1000 ± C.Y.

PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT. CONSTRUCT.

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

PLAN VIEW

DESIGN OPTION 9.8

0 250 500

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

DEER ISLAND PIER FACILITIES

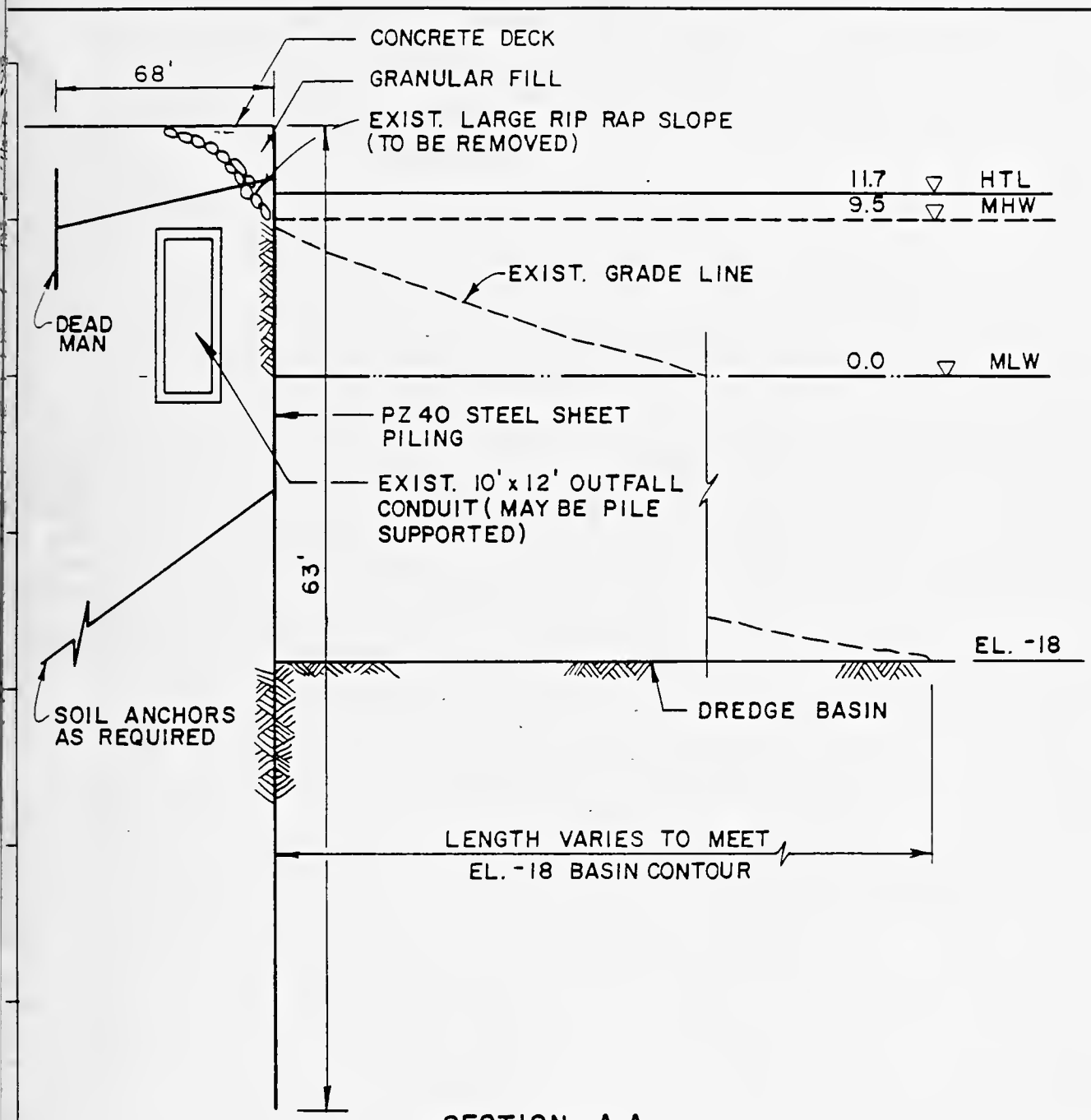
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 5 OF 28 DATE: JULY 1



SECTION A-A

RPOSE: TO CONSTRUCT A
RINE PORT TO RECEIVE
TERIALS & WORKERS FOR
EATMENT PLANT
NSTRUCTION

UM: MLW = 0.0 FT

ACENT PROPERTY OWNERS:

SEE ATTACHMENT B

SECTION VIEW

HORIZ. 0 40 80

0 10 20 VERT.

SCALE IN FEET

PREPARED BY:
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60 First Avenue
Waltham, MA. 02254

DEER ISLAND PIER FACILITIES

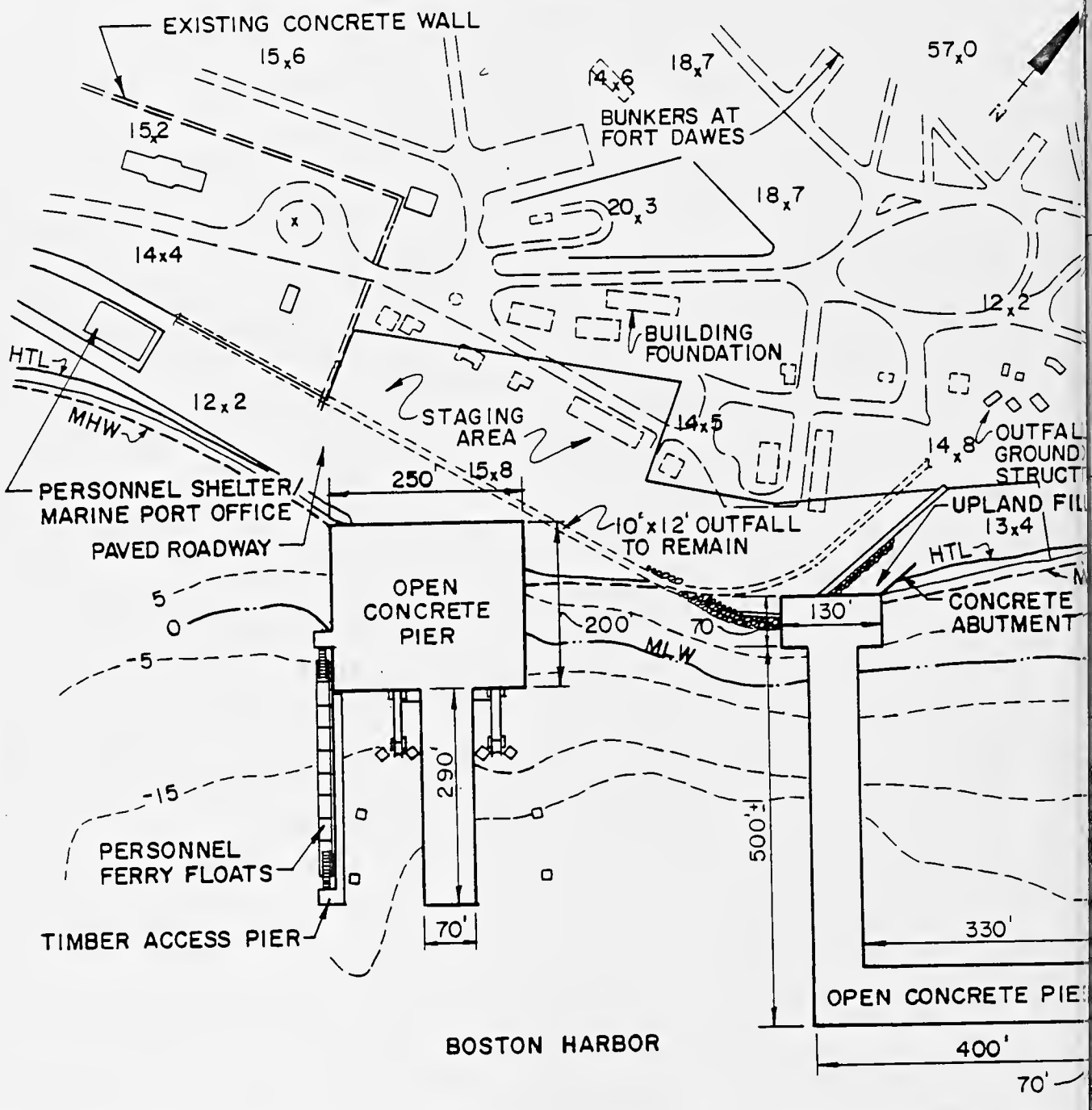
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 6 OF 28 DATE: MAY 1987



PURPOSE: CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

PLAN VIEW
DESIGN OPTION 9.5

0 200 400

SCALE IN FEET

PREPARED BY:
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60 First Avenue
Waltham, MA. 02254

DEER ISLAND
PIER FACILITIES

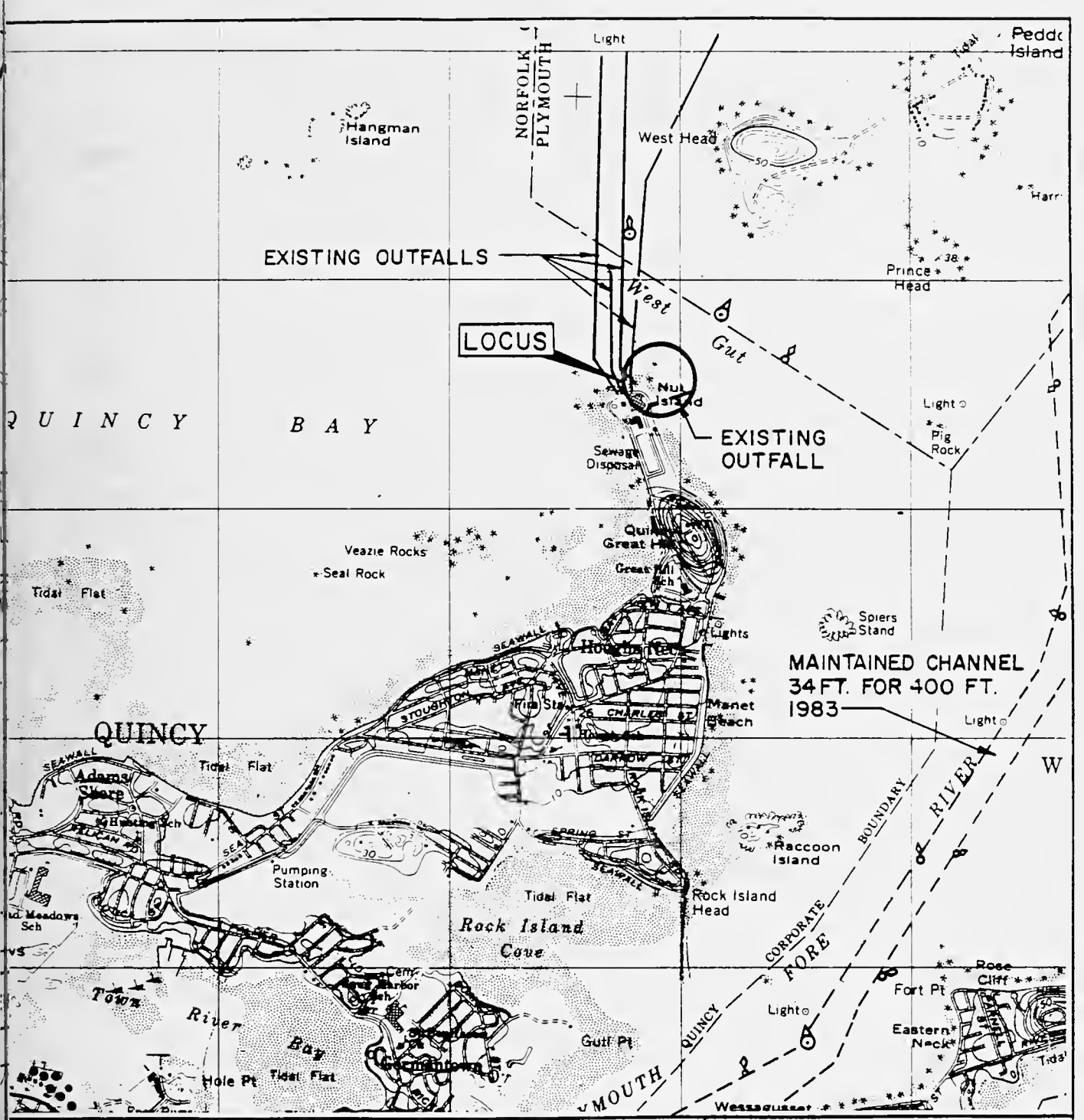
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: DEER ISLAND, BOSTON HARBOR

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 7 OF 28 DATE: MAY



RPOSE: TO CONSTRUCT A
RINE PORT TO RECEIVE
TERIALS & WORKERS FOR
EATMENT PLANT CONSTRUCT.

TUM: MLW = 0.0 FT.

JACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

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60 First Avenue
Waltham, MA. 02254

PROPOSED OPEN PIER AND HAUL ROAD

CITY OF: QUINCY

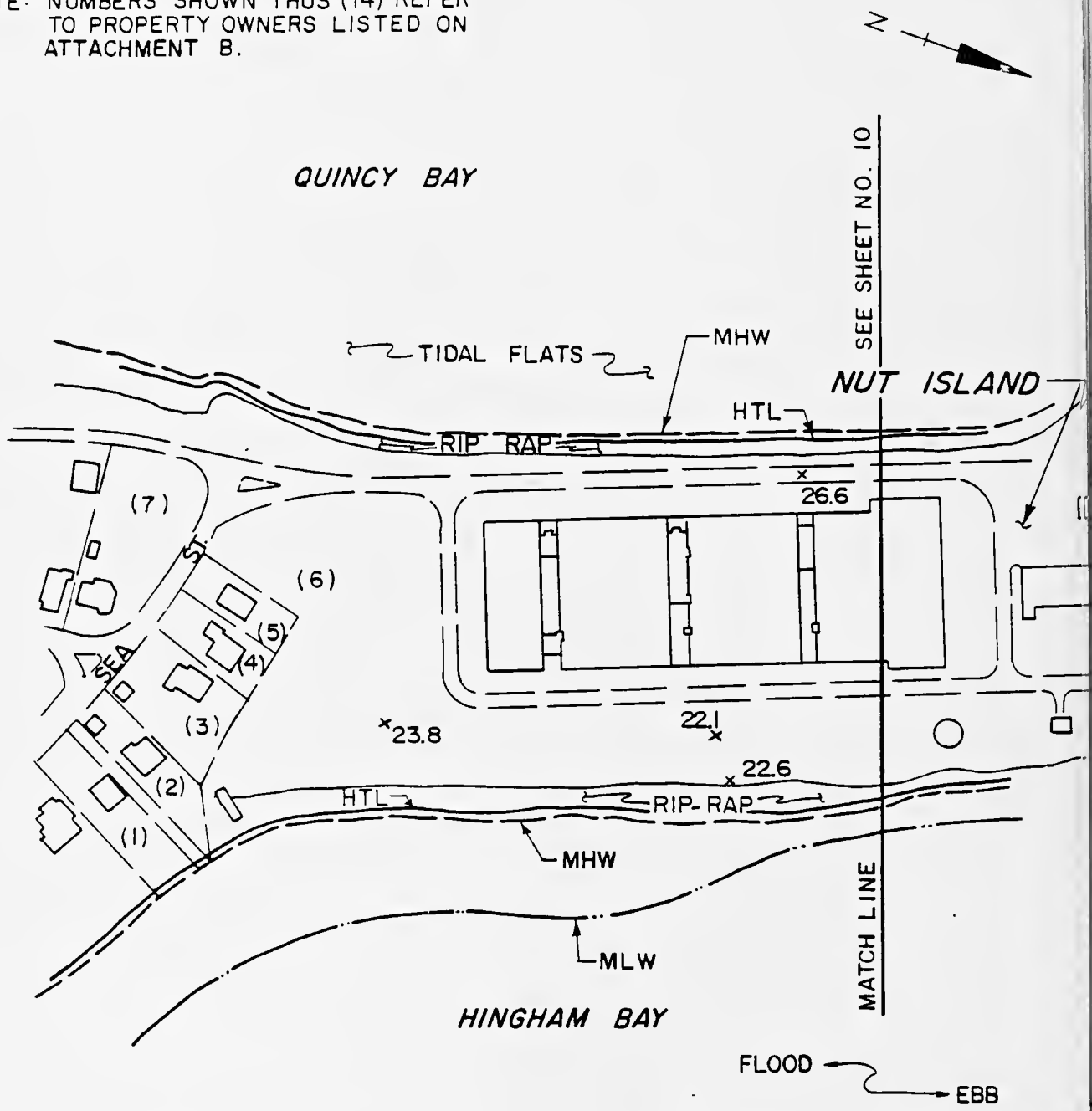
COUNTY OF: NORFOLK

AT: QUINCY BAY

PROPONENT: MASS. WATER RESOURCES AUTORITY

SHEET 8 OF 28 DATE: MAY 1987

NOTE: NUMBERS SHOWN THUS (14) REFER TO PROPERTY OWNERS LISTED ON ATTACHMENT B.



PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

SEE ATTACHMENT B

PLOT PLAN

200 0 200

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

NUT ISLAND PIER FACILITIES

CITY OF: QUINCY

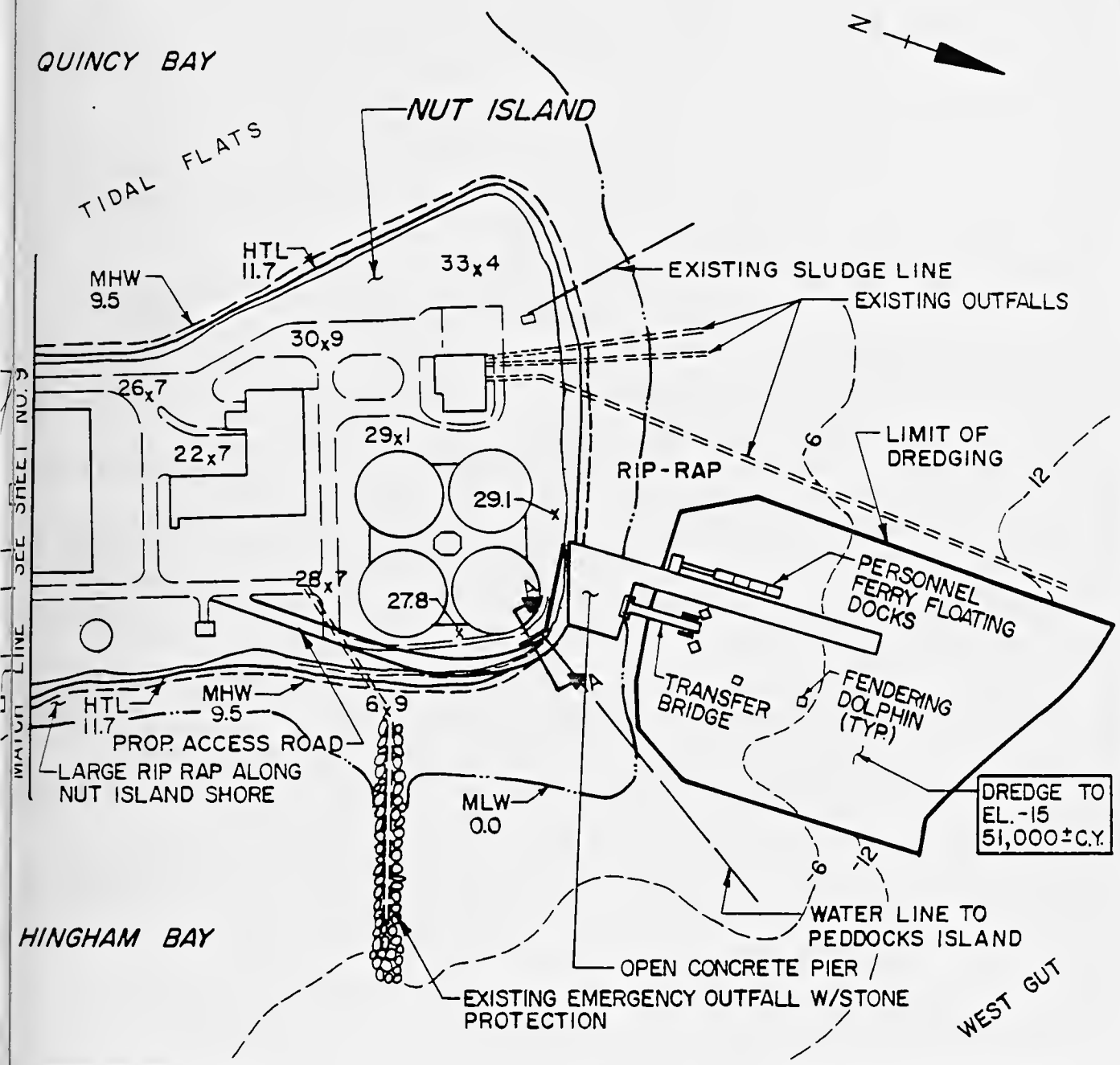
COUNTY OF: NORFOLK

AT: NUT ISLAND QUINCY BAY

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 9 OF 28 DATE: MAY 19

ONTINUED FROM
SHEET 9/22



IRPOSE: TO CONSTRUCT A
ARINE PORT TO RECEIVE
ATERIALS & WORKERS FOR
EATMENT PLANT
NSTRUCTION

TUM: MLW = 0.0 FT.

DJACENT PROPERTY OWNERS:

E ATTACHMENT B

PLAN VIEW

0 200 400

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

NUT ISLAND PIER FACILITIES

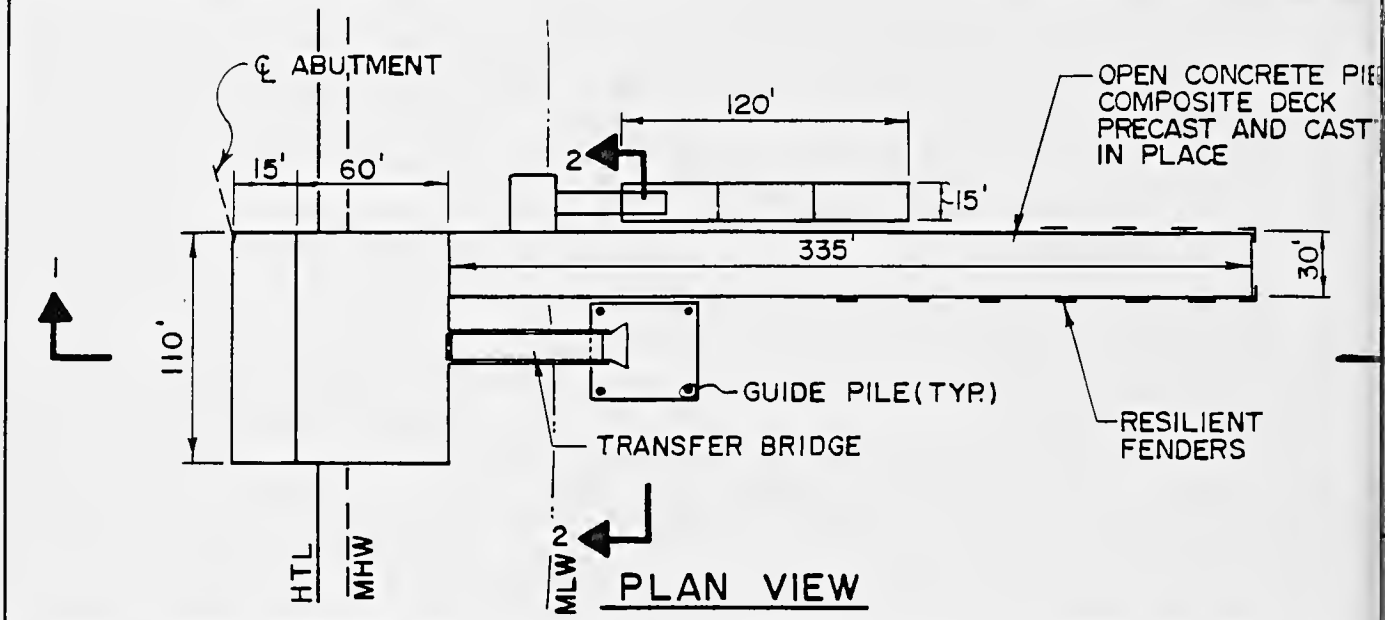
CITY OF: QUINCY

COUNTY OF: NORFOLK

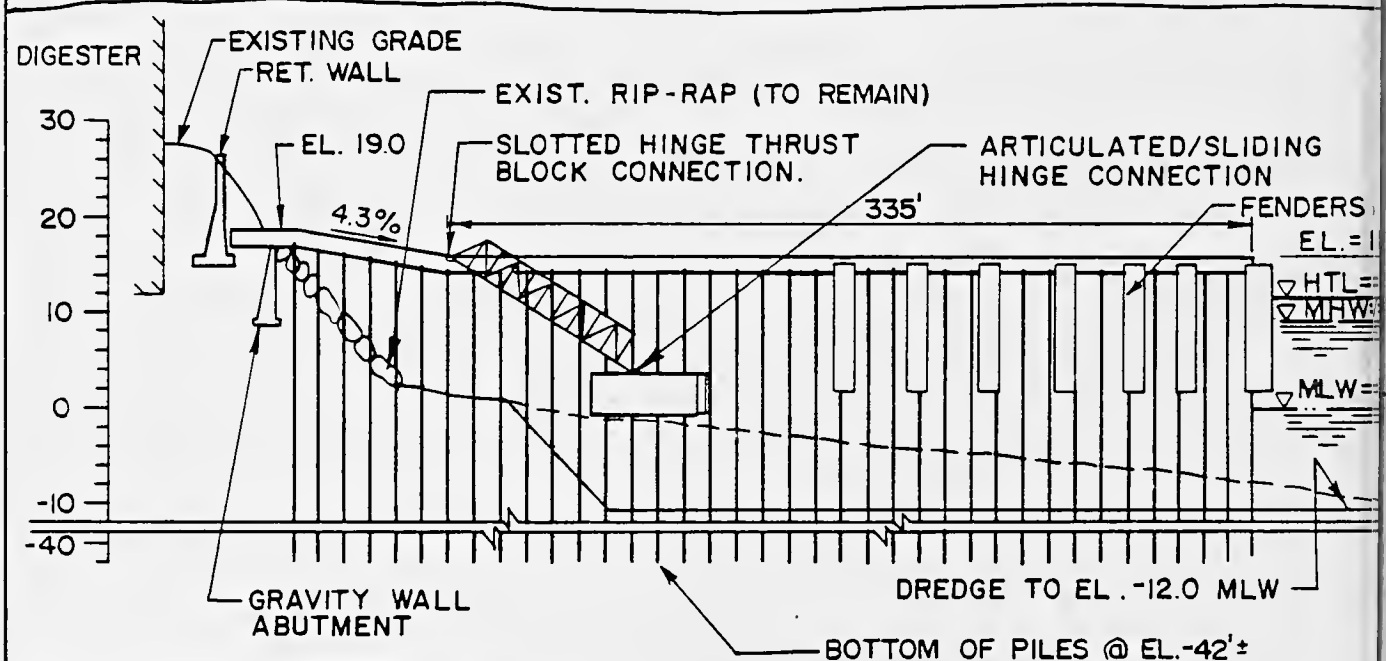
AT: NUT ISLAND QUINCY BAY

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 10 OF 28 DATE: MAY 1987



PLAN VIEW



NOTE: 1) PILES LOCATIONS WILL BE PRE-AUGERED TO EL:-40 ±
2) PILES WILL BE PRESTRESSED CONCRETE @ 12' O.C.

SECTION 1-1

PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

SECTION VIEWS

HORIZ. 80 0 80

VERT. 20 0 20

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

NUT ISLAND PIER FACILITI

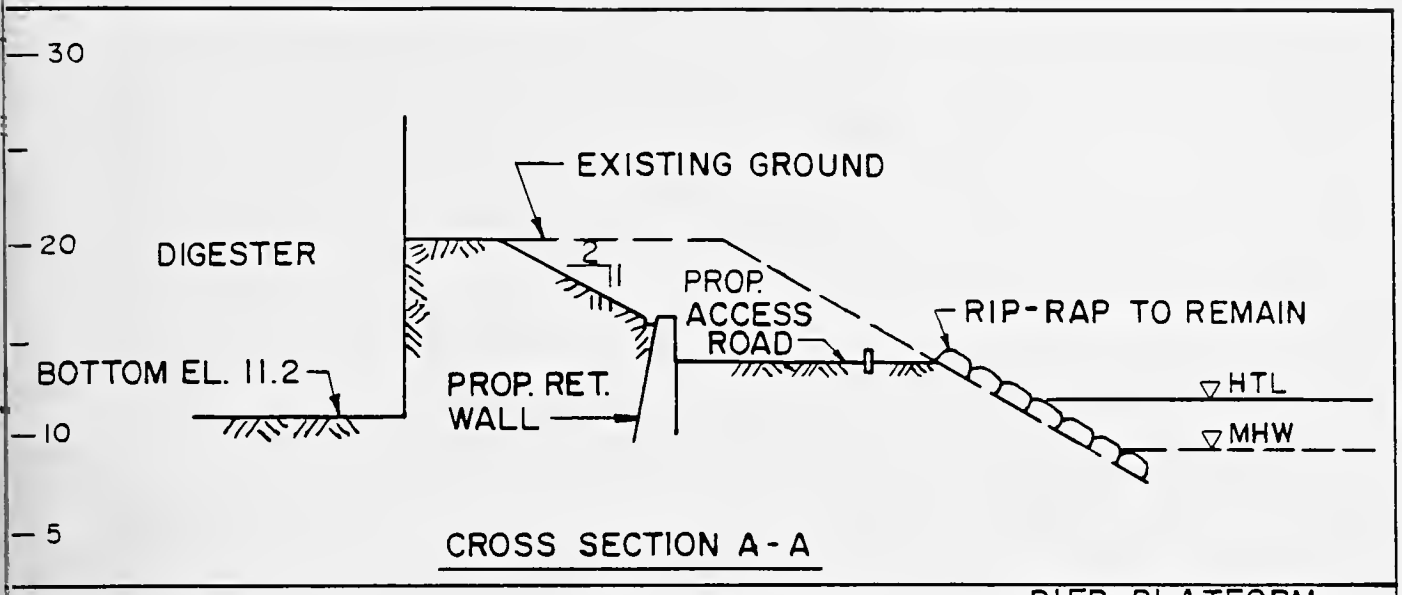
CITY OF: QUINCY

COUNTY OF: NORFOLK

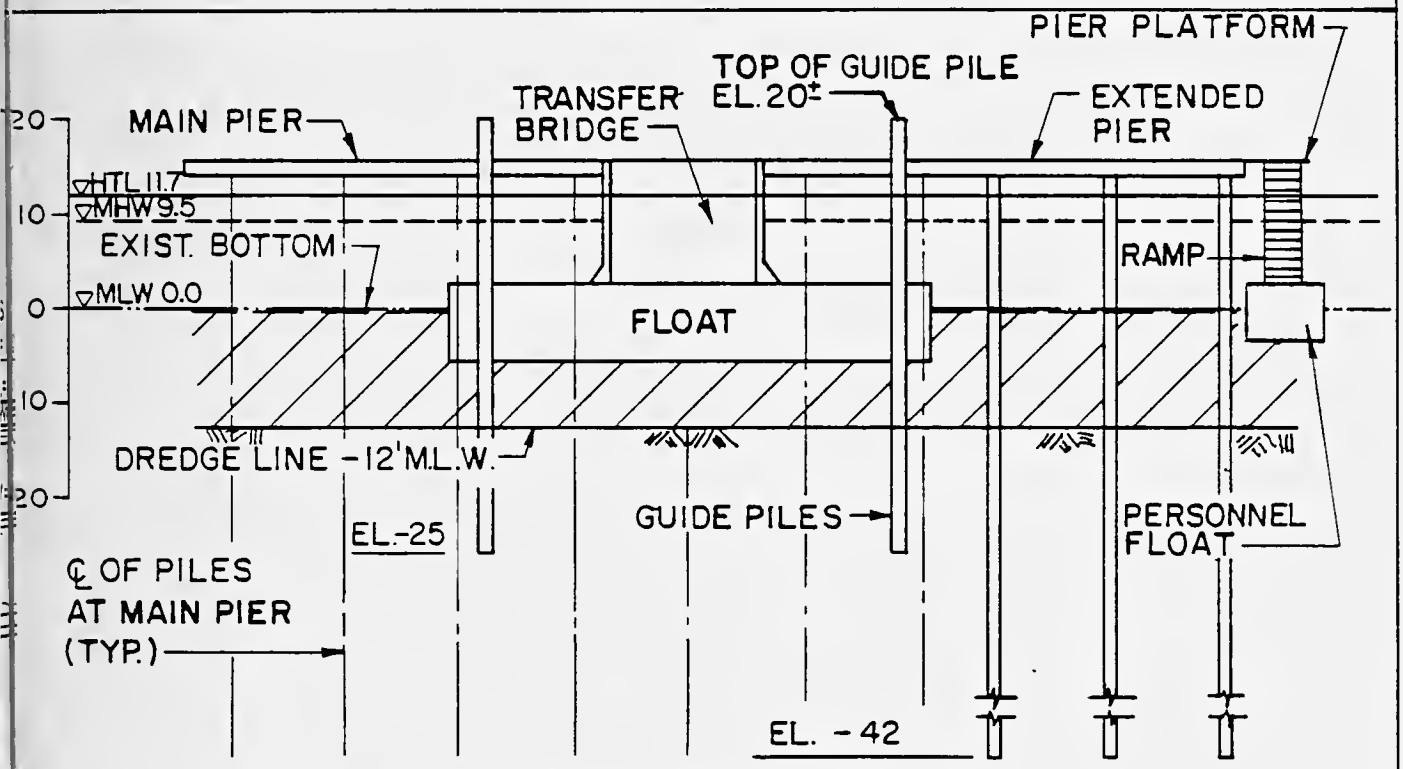
AT: NUT ISLAND, QUINCY E

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 11 OF 28 DATE: MAY 1



CROSS SECTION A-A



SECTION 2-2

RPOSE: TO CONSTRUCT A
RINE PORT TO RECEIVE
TERIAL & WORKERS FOR
EATMENT PLANT
NSTRUCTION

'UM: MLW = 0.0 FT.

JACENT PROPERTY OWNERS:

SEE ATTACHMENT B

SECTION VIEWS

0 20 40

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

NUT ISLAND
PIER FACILITIES

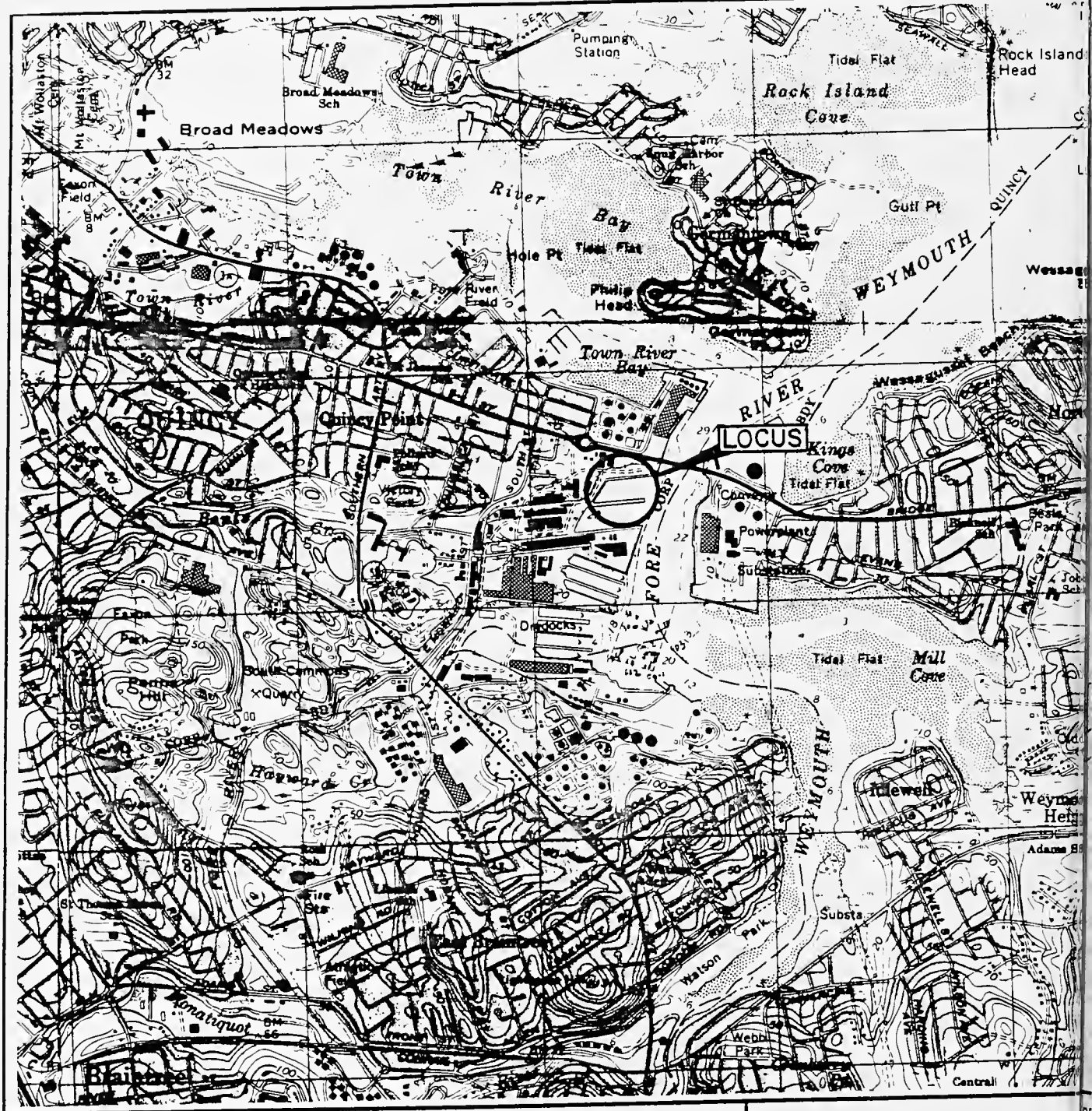
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: NUT ISLAND, QUINCY BAY

PROPONENT: MASS WATER
RESOURCES AUTHORITY

SHEET 12 OF 28 DATE: MAY 1987



PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION
DATUM: MLW = 0.00 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

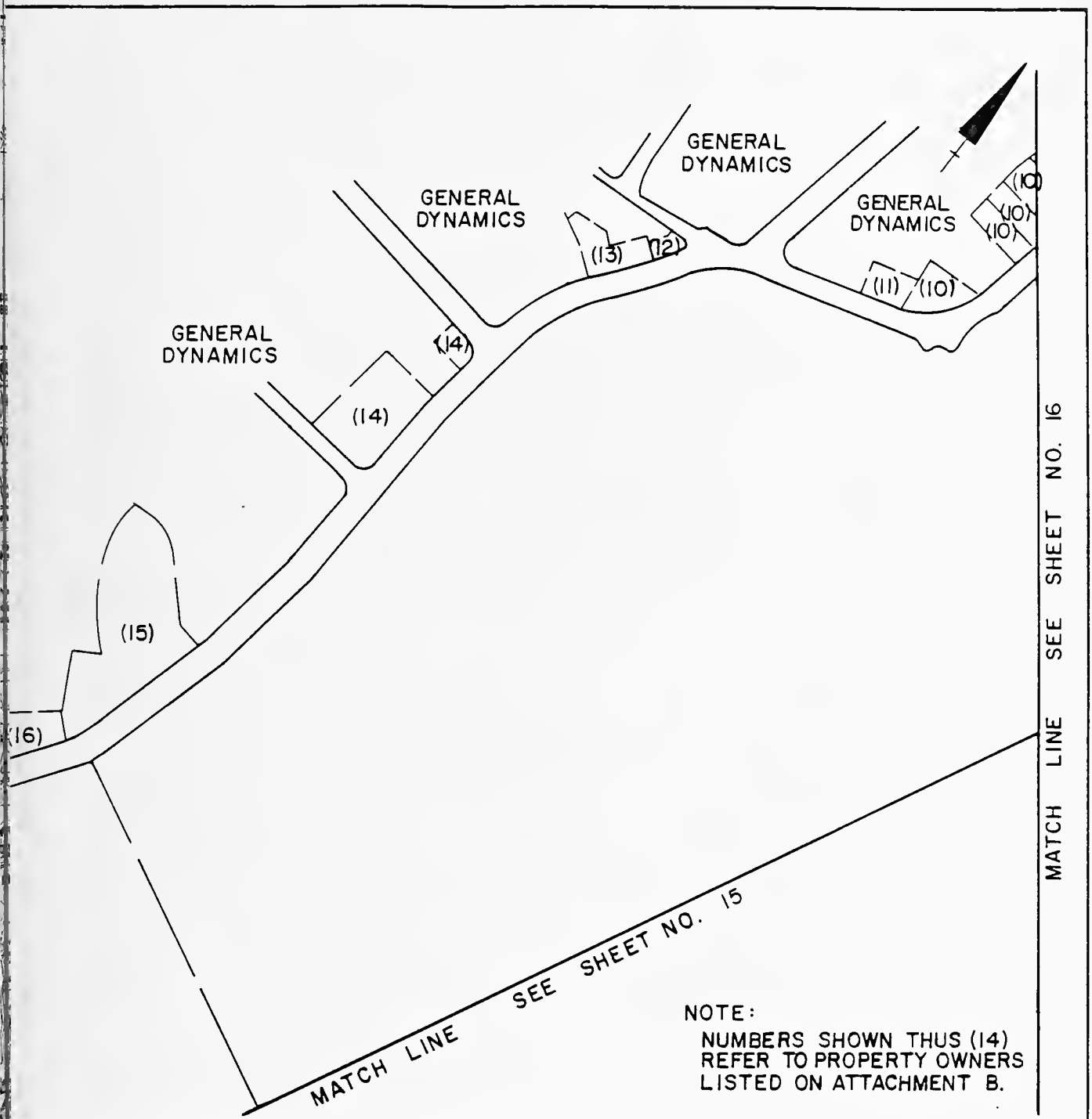
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: GENERAL DYNAMICS WEYMOUTH FORE RIVER

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 13 OF 28 DATE: MAY 19



NOTE:
NUMBERS SHOWN THUS (14) REFER TO PROPERTY OWNERS LISTED ON ATTACHMENT B.

RPOSE: TO CONSTRUCT A RINE PORT TO RECEIVE TERIAL & WORKERS FOR ATMENT PLANT ISTRUCTION

UM: MLW = 0.0 FT.

ACENT PROPERTY OWNERS:

ATTACHMENT B

PLOT PLAN

0 300 600

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

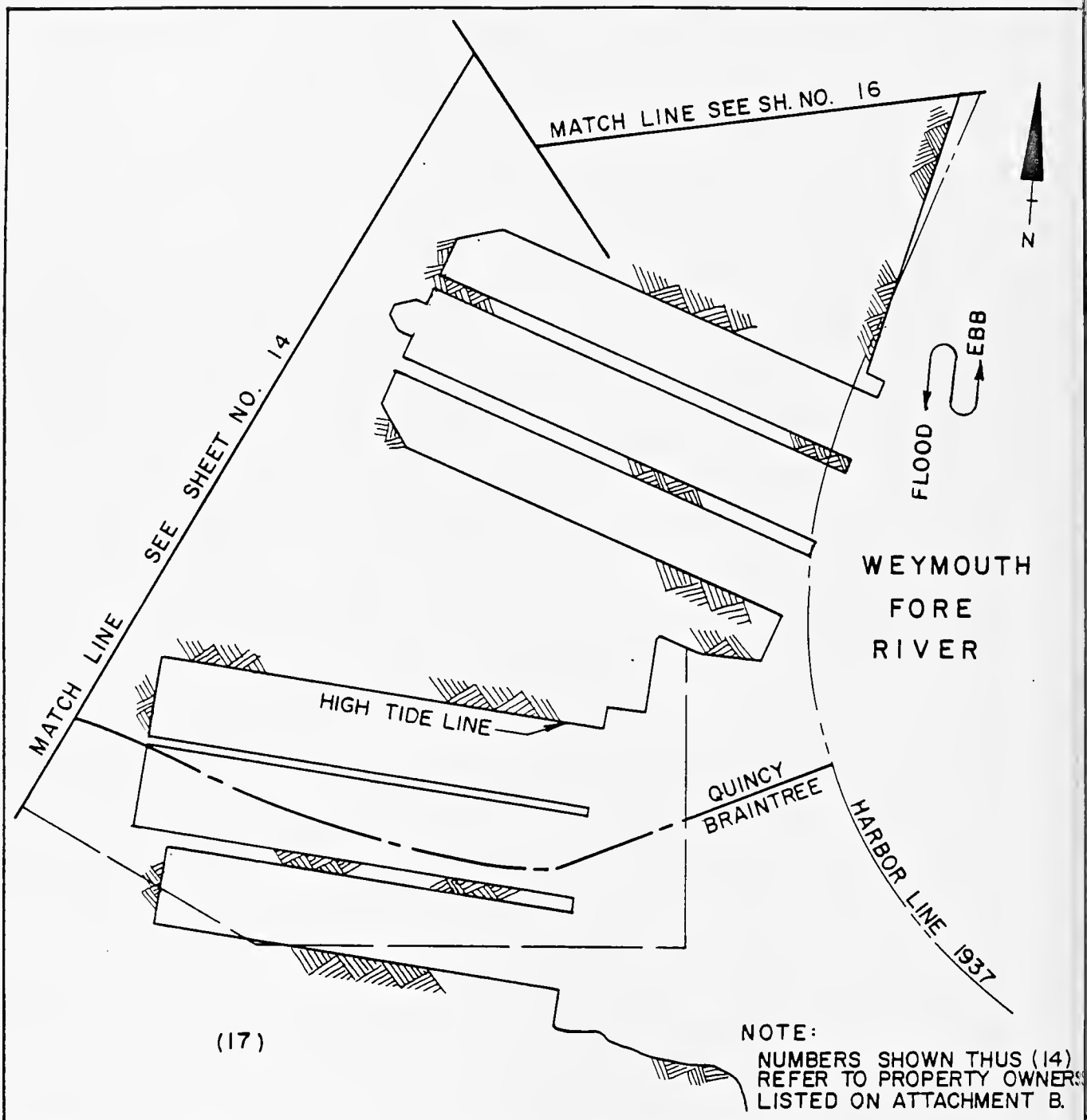
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: GENERAL DYNAMICS SHIPYARD

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 14 OF 28 DATE: MAY 1987



PURPOSE: TO CONSTRUCT A MARINE PORT TO RECEIVE MATERIAL & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS: SEE ATTACHMENT B

PLOT PLAN

0 300 600

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

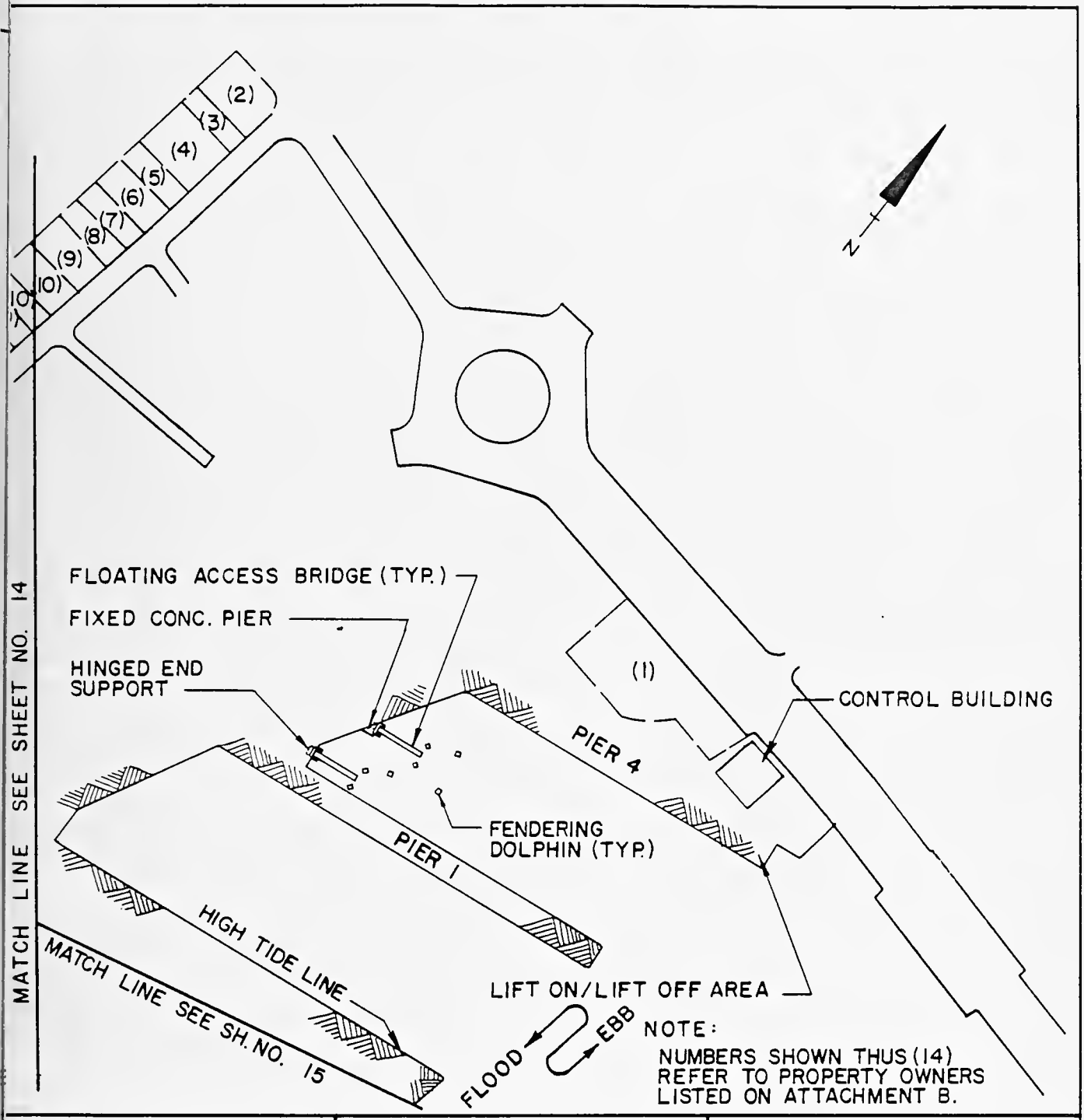
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: GENERAL DYNAMICS SHIPYARD

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 15 OF 28 DATE: MAY



RPOSE: TO CONSTRUCT A RINE PORT TO RECEIVE TERIAL & WORKERS FOR EATMENT PLANT NSTRUCTION.

TUM: MLW = 0.0 FT.

JACENT PROPERTY OWNERS: E ATTACHEMENT B

PLOT PLAN

0 300 600

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

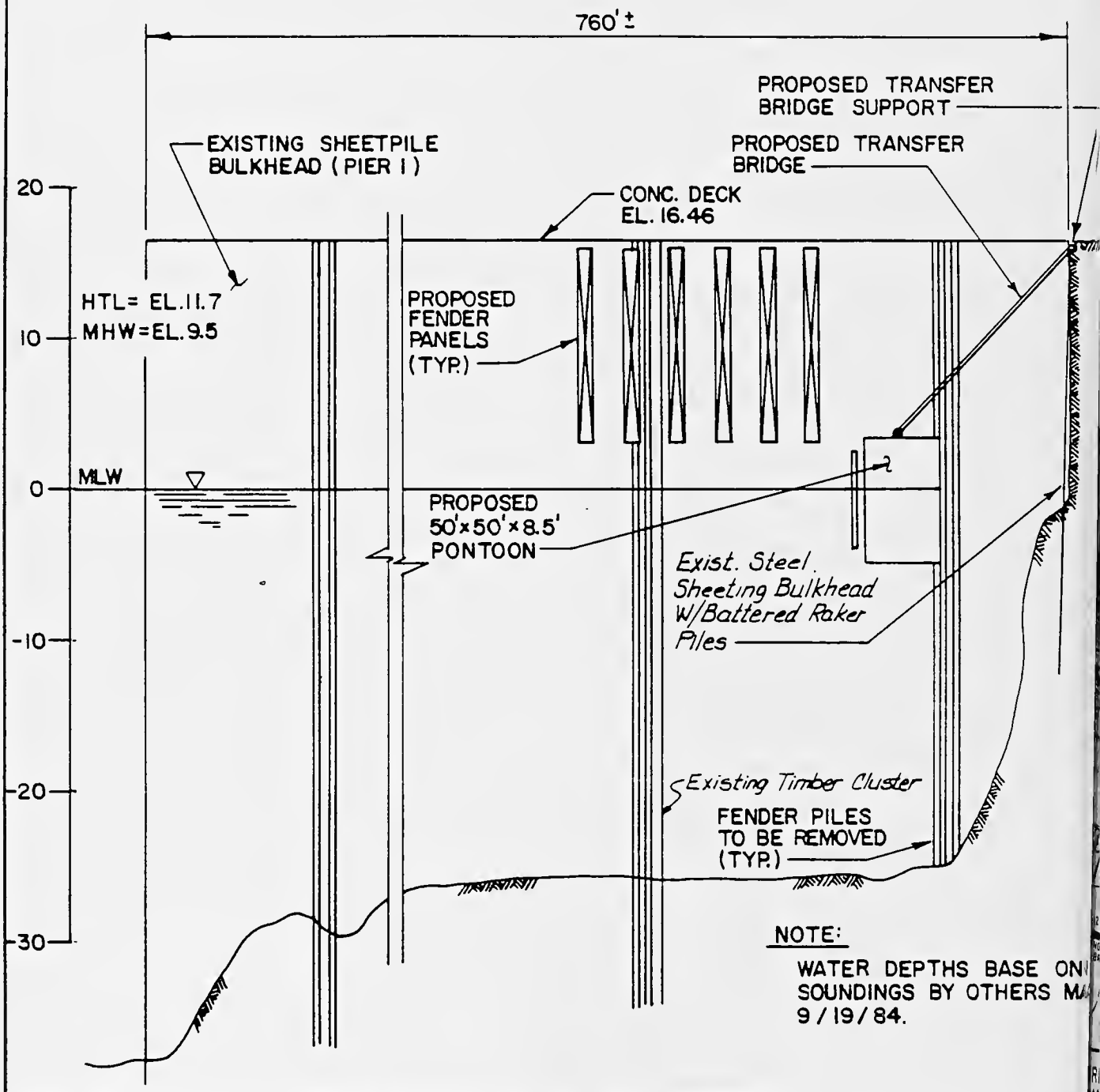
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: GENERAL DYNAMICS SHIPYARD

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 16 OF 28 DATE: MAY 1987



PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIALS & WORKERS FOR TREATMENT PLANT. CONSTRUCT.

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

PLAN VIEW

DESIGN OPTION 9.8

H. 0 100 200

V. 0 10 20

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE MARINE FACILIT

TOWN OF: QUINCY

COUNTY OF: NORFOLK

AT: WEYMOUTH FORE RIVER

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 17 OF 28 DATE: MAY

POSE: TO CONSTRUCT
ARINE PORT TO SHIP
ERIALS AND WORKERS
TREATMENT PLANT
STRUCTION
UM: MLW = 0.0 FT.

ACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON SHORE
PIER FACILITIES

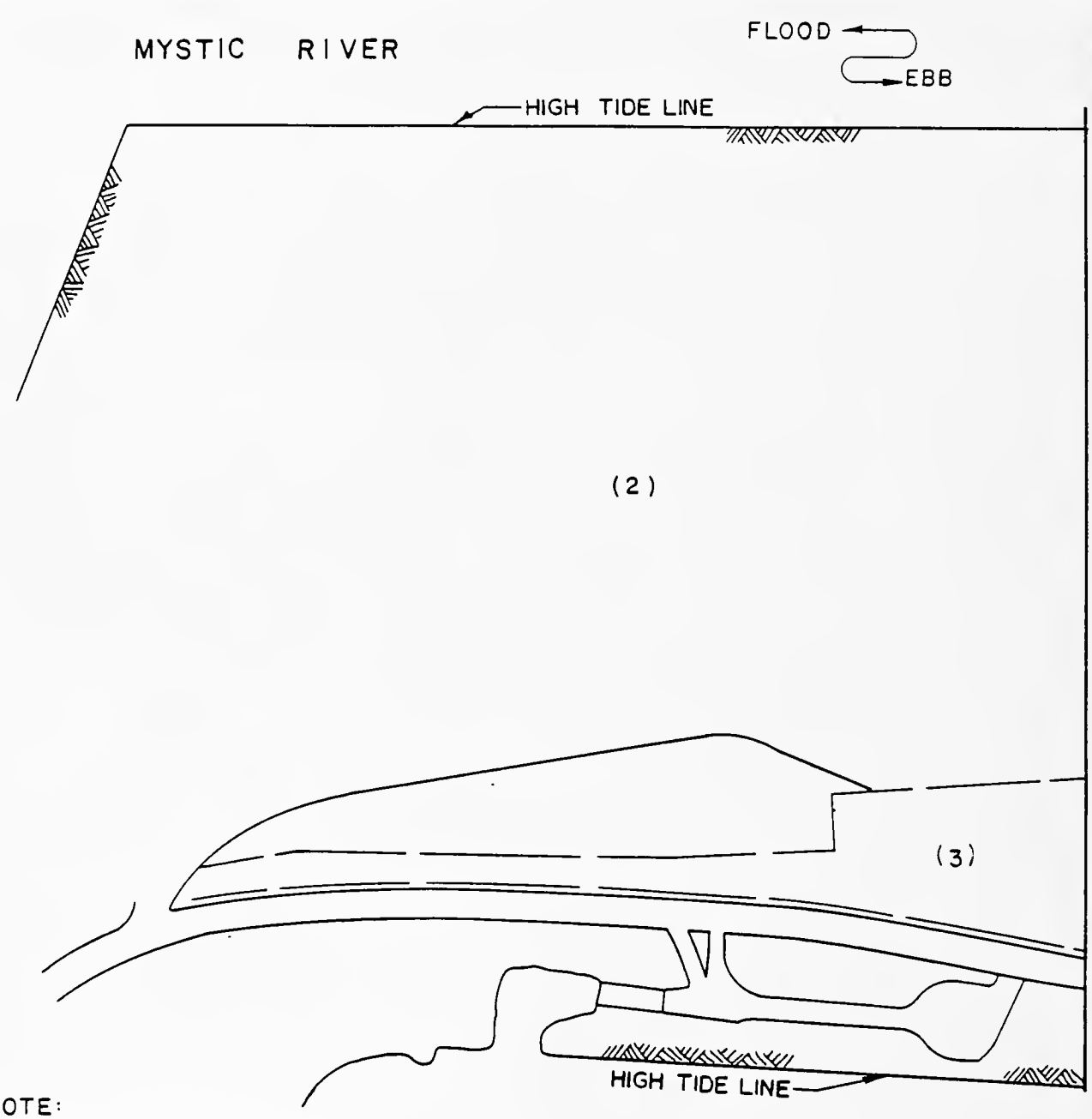
CITY OF: CHARLESTOWN

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR, PIER 48, 49 & 50.

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 18 OF 28 DATE: MAY 1987



NOTE:
NUMBERS SHOWN THUS (14) REFER TO PROPERTY OWNERS LISTED ON ATTACHMENT B.

PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIAL & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

PLOT PLAN

0 100 200 300

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

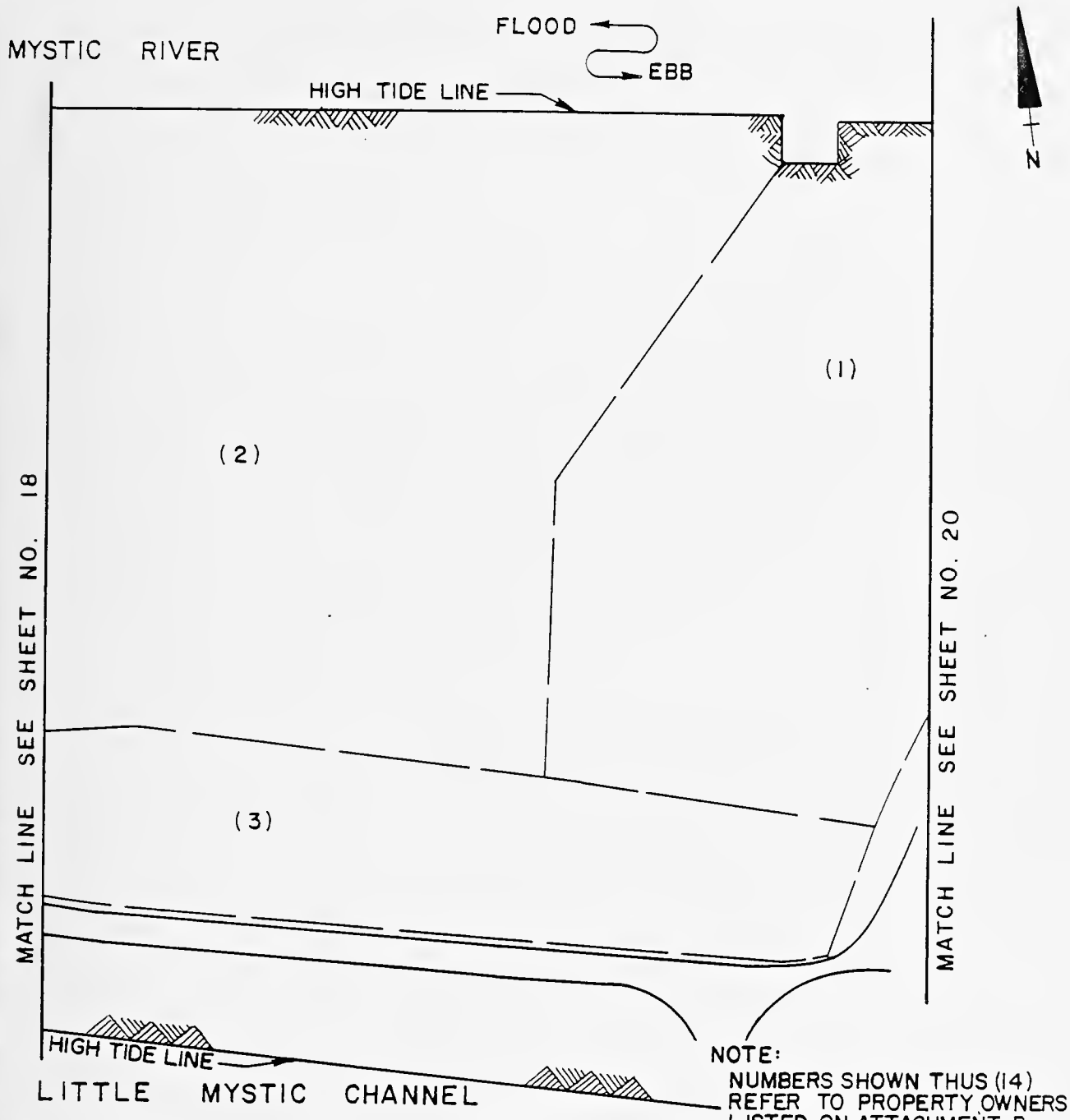
CITY OF: CHARLESTOWN

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR, PIERS 48, 49 &

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 19 OF 28 DATE: MAY 19



NOTE:
NUMBERS SHOWN THUS (14) REFER TO PROPERTY OWNERS LISTED ON ATTACHMENT B.

RPOSE: TO CONSTRUCT A
RINE PORT TO SHIP MATERIAL
/ORKERS FOR TREATMENT
NT CONSTRUCTION

UM: MLW = 0.0 FT.

ACENT PROPERTY OWNERS:

EE ATTACHMENT B

PLOT PLAN

0 100 200 300

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

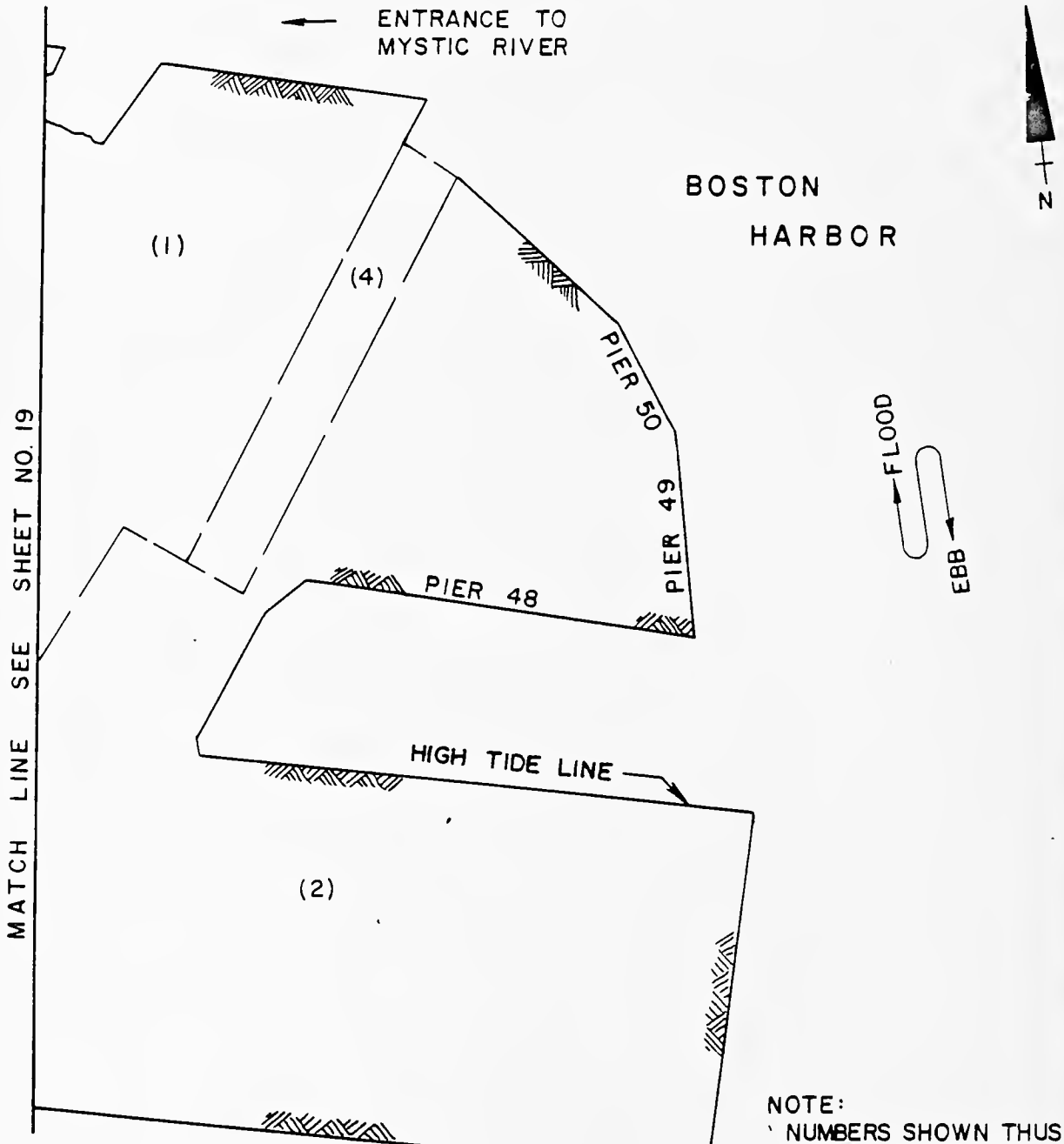
CITY OF: CHARLESTOWN

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 20 OF 28 DATE: MAY 1987



NOTE:
NUMBERS SHOWN THUS (1
REFER TO PROPERTY OW
LISTED ON ATTACHMENT

PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIAL & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

PLOT PLAN

0 100 200 300

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITI

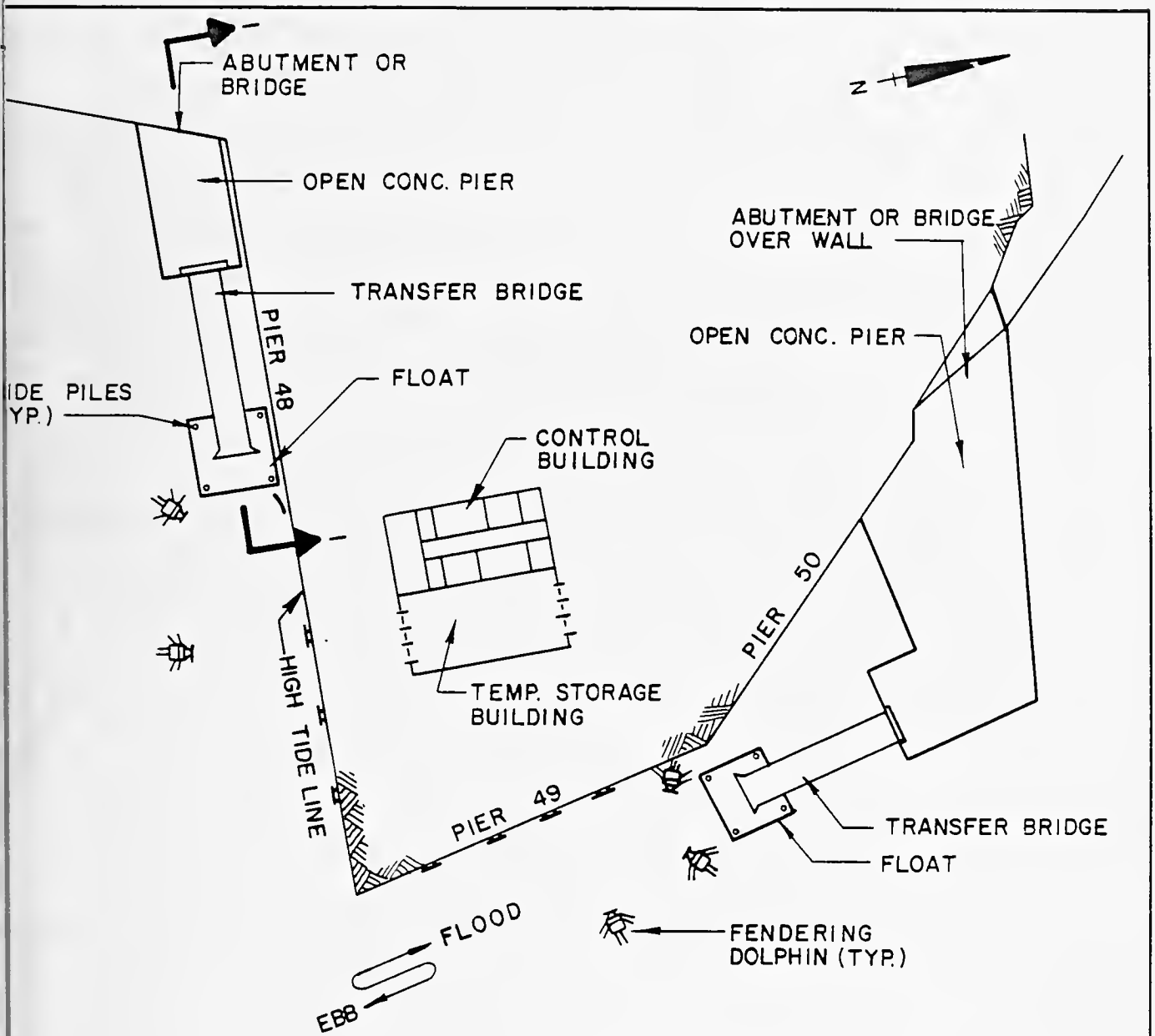
CITY OF: CHARLESTOWN

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR, PIER 48,49 & 50

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 21 OF 28 DATE: MAY



POSE: TO CONSTRUCT A
INE PORT TO SHIP MATERIAL
ORKERS FOR TREATMENT
NT CONSTRUCTION

UM: MLW = 0.0 FT.

ACENT PROPERTY OWNERS:

EE ATTACHMENT B

PLAN VIEW

0 100 200

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

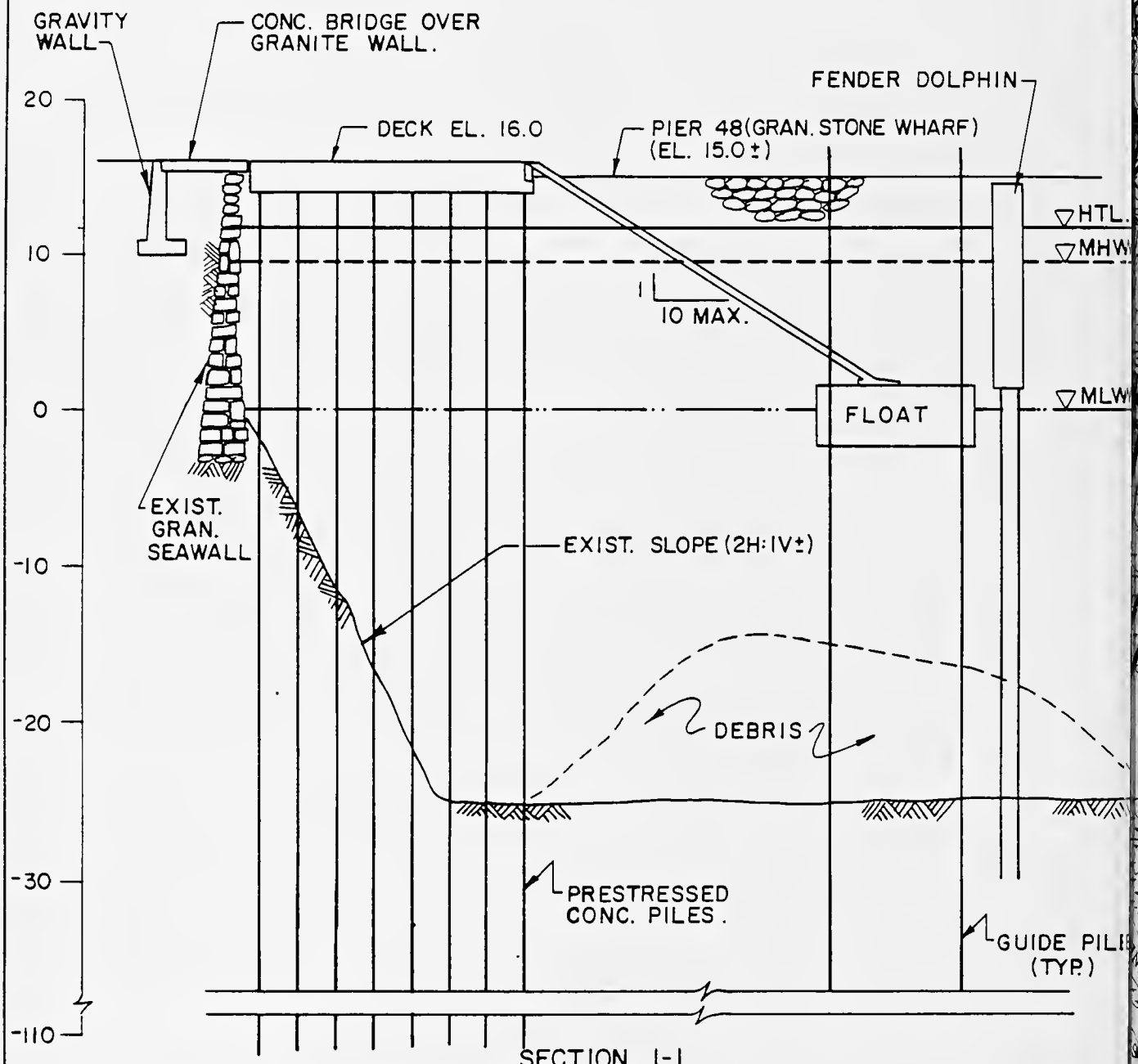
ON-SHORE PIER FACILITIES

CITY OF: CHARLESTOWN
COUNTY OF: SUFFOLK

AT: BOSTON HARBOR

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 22 OF 28 DATE: MAY 1987



SECTION 1-1

PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIALS & WORKERS DURING TREATMENT PLANT CONSTRUCT.

DATUM: MLW = 0.0 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

SECTION VIEW

HOR. 0 50 100

VER. 0 10 20

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

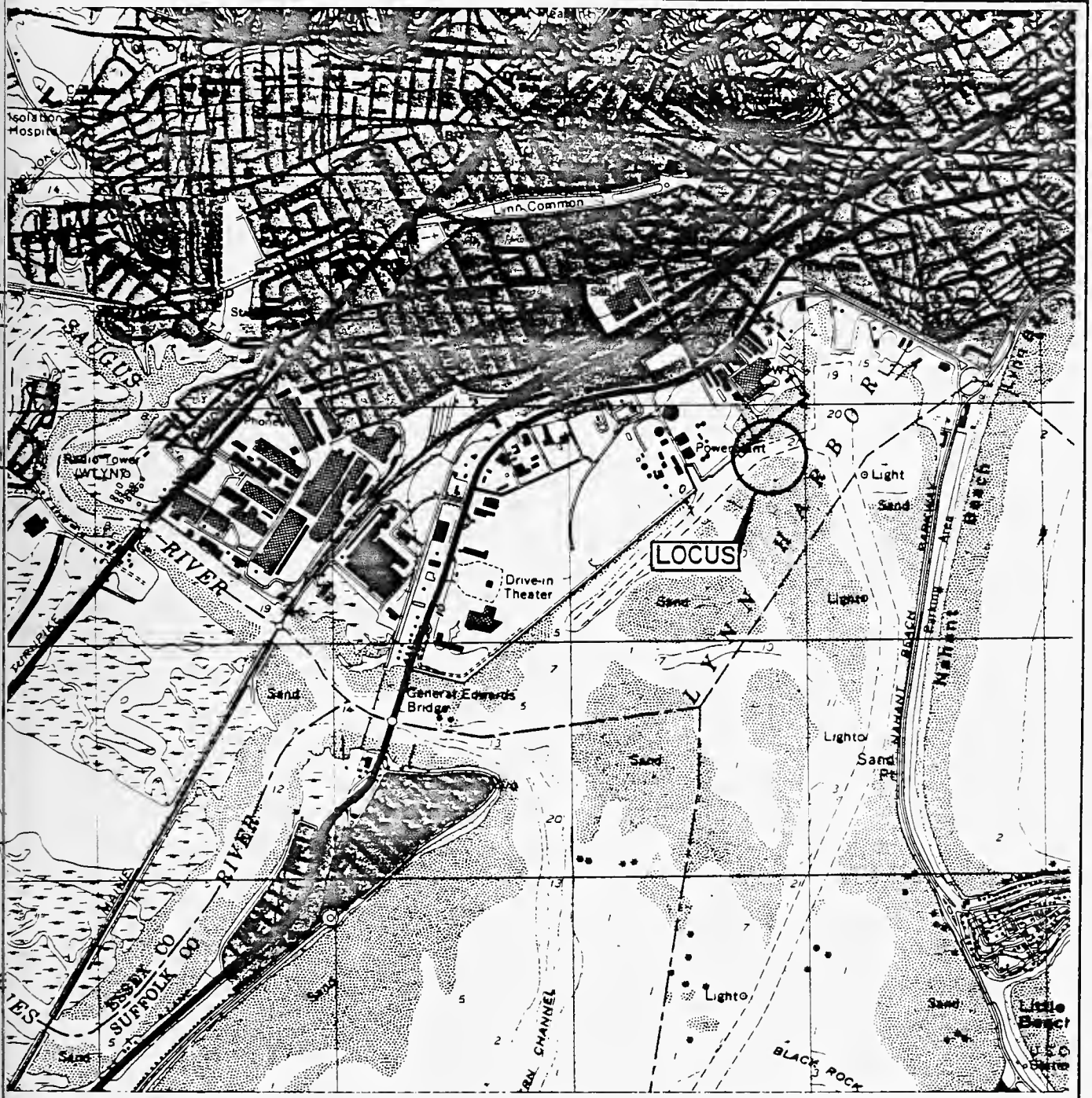
CITY OF: CHARLESTOWN

COUNTY OF: SUFFOLK

AT: BOSTON HARBOR, PIERS 49 &

PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET 23 OF 28 DATE: MAY



RPOSE: TO CONSTRUCT A
RINE PORT TO
ERIALS & WORKERS FOR
ATMENT PLANT
STRUCTION

UM: MLW = 0.00 FT

ACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE
PIER FACILITIES

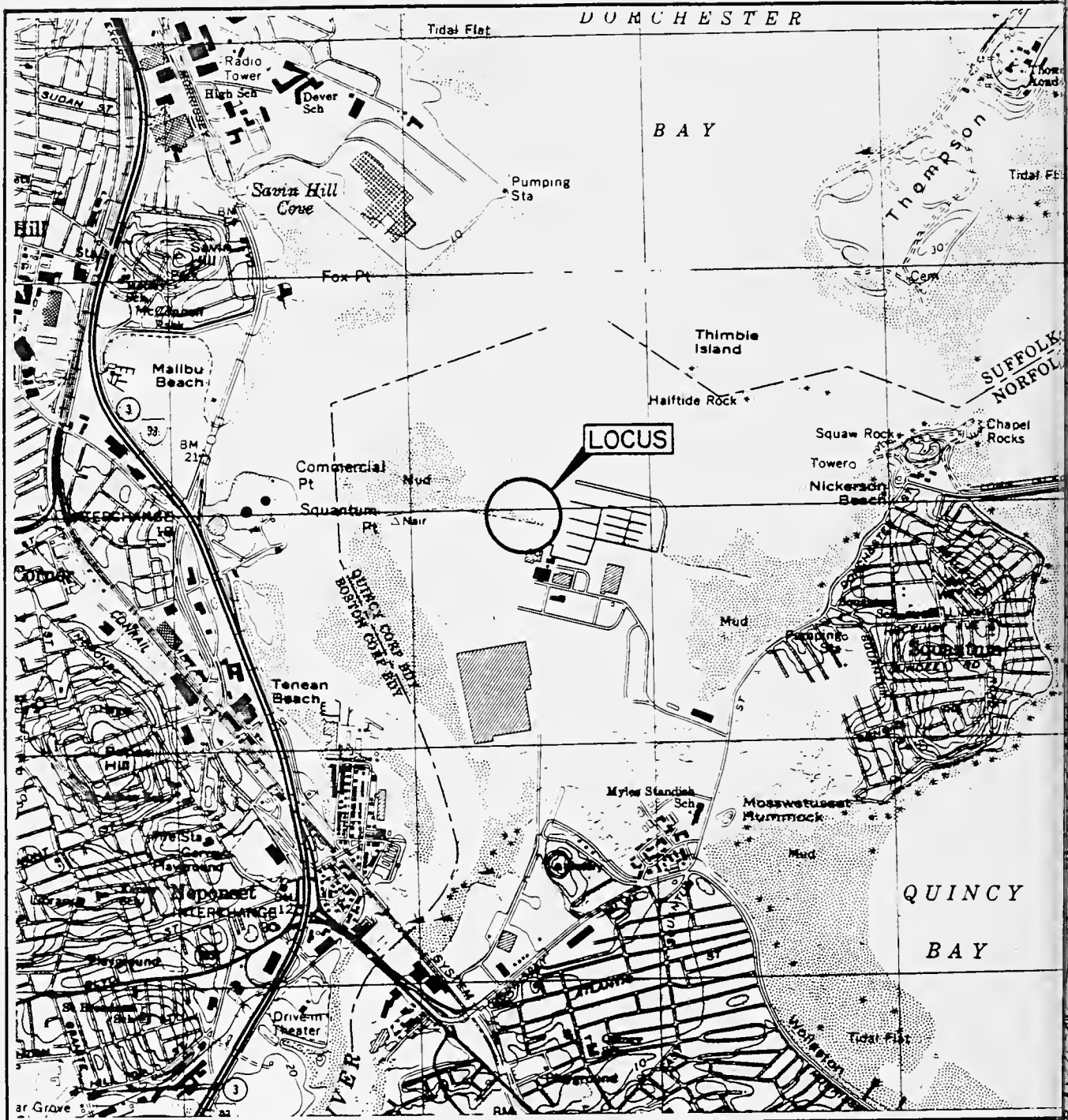
CITY OF: LYNN

COUNTY OF: ESSEX

AT: LYNN HARBOR - BLOSSOM ST.

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 24 OF 28 DATE: MAY 1987



PURPOSE: TO CONSTRUCT A MARINE PORT TO MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION

DATUM: MLW = 0.00 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE PIER FACILITIES

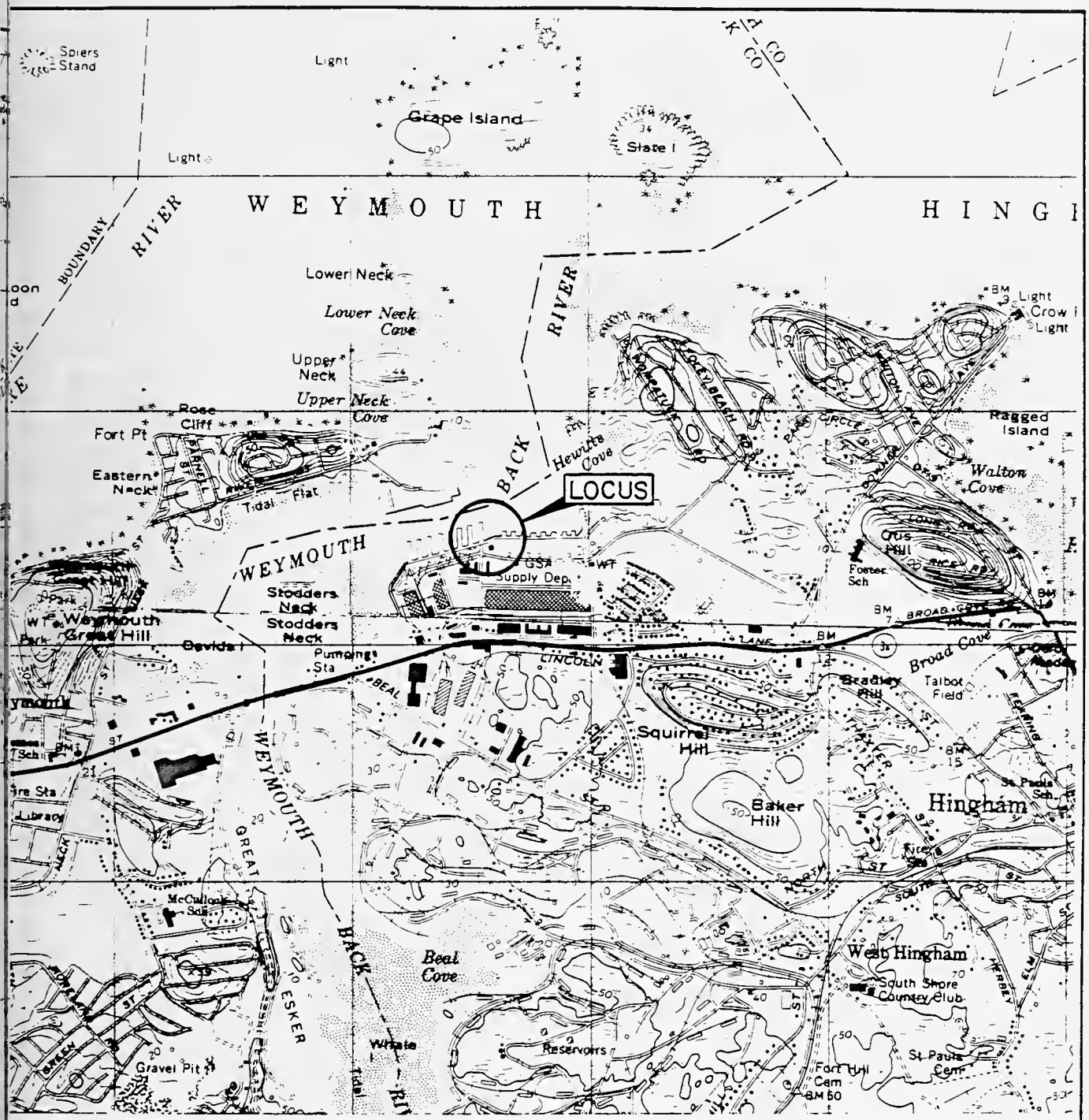
CITY OF: QUINCY

COUNTY OF: NORFOLK

AT: MARINA BAY, WEST SQUAN

PROPONENT: MASS WAT RESOURCES AUTHORITY

SHEET 25 OF 28 DATE: MA



POSE: TO CONSTRUCT
ARINE PORT TO
ERIALS & WORKERS FOR
ATMENT PLANT
STRUCTION

UM: MLW = 0.00 FT.

ACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:
Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON-SHORE
PIER FACILITIES

CITY OF: HINGHAM

COUNTY OF: PLYMOUTH

AT: HEWITT'S COVE MOUTH OF WEYMOUTH BACK RIVER

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 26 OF 28 DATE: MAY 1987

PURPOSE: TO CONSTRUCT A MARINE PORT TO SHIP MATERIALS & WORKERS FOR TREATMENT PLANT CONSTRUCTION
DATUM: MLW = 0.00 FT.

ADJACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON - SHORE
PIER FACILITIES

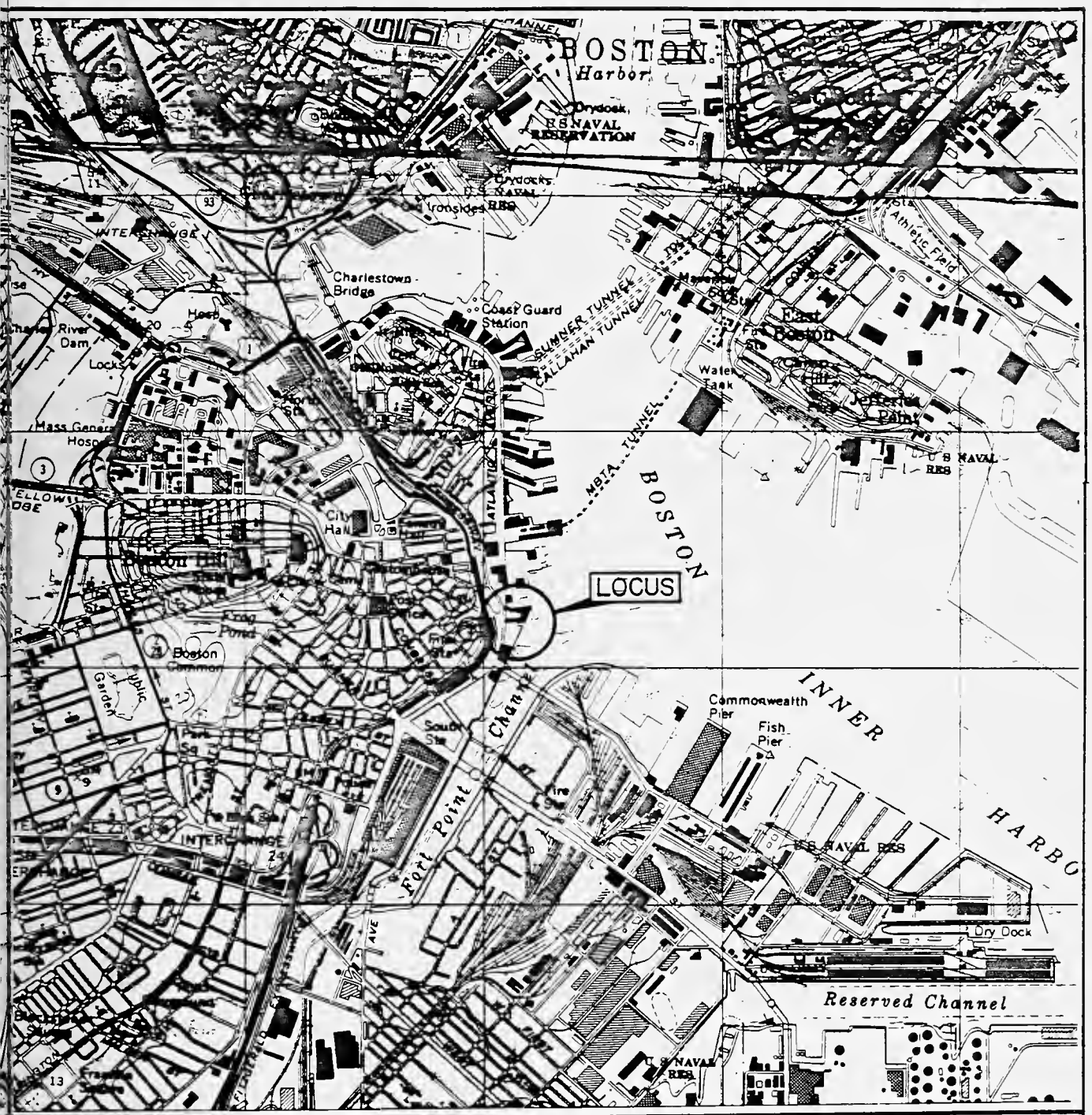
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: NORTH STATION, MOUTH OF CHARLES

PROPONENT: MASS WAT RESOURCES AUTHORITY

SHEET 27 OF 28 DATE: MA



POSE: TO CONSTRUCT A
INE PORT TO SHIP
ERIALS & WORKERS FOR
ATMENT PLANT
STRUCTION

UM: MLW = 0.00 FT.

ACENT PROPERTY OWNERS:

SEE ATTACHMENT B

LOCUS MAP

0 2000 4000

SCALE IN FEET

PREPARED BY:

Maguire Group Inc.
60 First Avenue
Waltham, MA. 02254

ON - SHORE
PIER FACILITIES

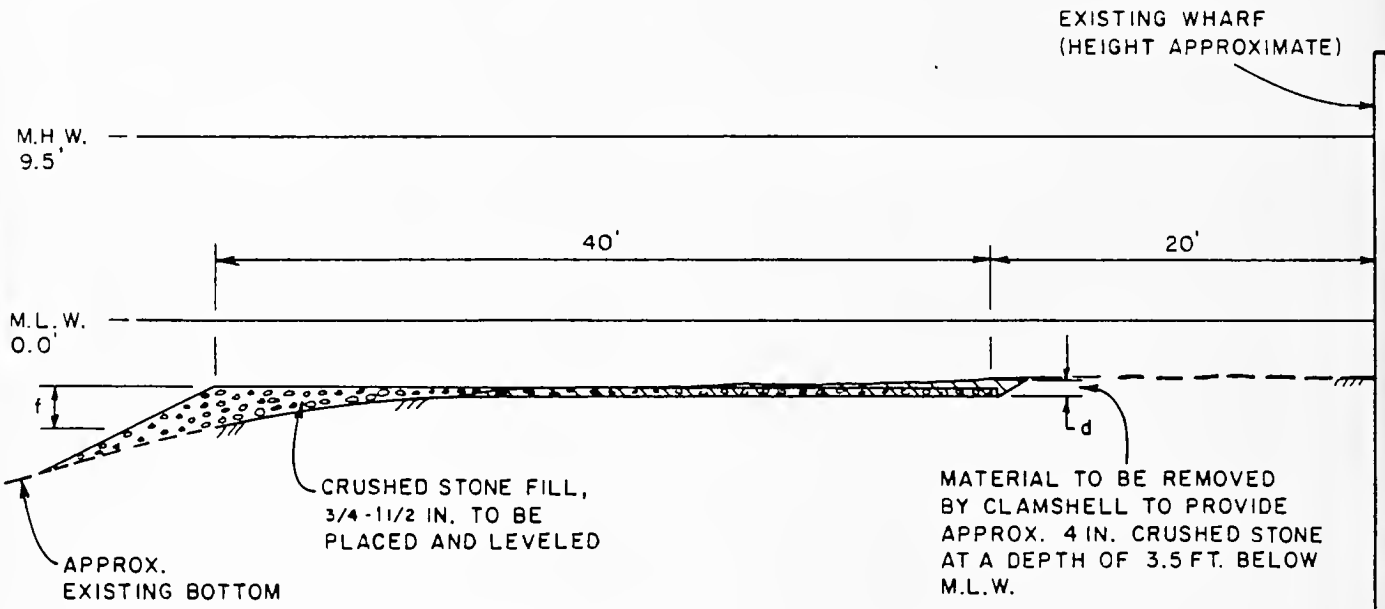
CITY OF: BOSTON

COUNTY OF: SUFFOLK

AT: ROWES WHARF, BOSTON INNER HARBOR

PROPONENT: MASS WATER RESOURCES AUTHORITY

SHEET 28 OF 28 DATE: MAY 1987



NOTES

1. DIMENSION d, MAXIMUM DEPTH OF DREDGED CUT, VARIES FROM 0 FT. AT SOUTH END OF UNLOADING AREA TO APPROX. 3 FT. AT NORTH CORNER. APPROX. 50 TO 75 YD^3 DREDGED MATERIAL TO BE LANDFILLED ON DEER ISLAND.
2. DIMENSION f, MAXIMUM DEPTH OF CRUSHED STONE FILL, VARIES FROM 4 IN. AT NORTH CORNER TO APPROX. 4 FT. AT SOUTH CORNER. TOTAL CRUSHED STONE FILL APPROX. 200 YD^3

PURPOSE:
PROVIDE TEMPORARY FACILITY TO OFF-LOAD 17,000 YD^3 OF SAND FROM BARGES

ADJACENT PROPERTY OWNER:
COMMONWEALTH OF MASS.

SECTION A—A

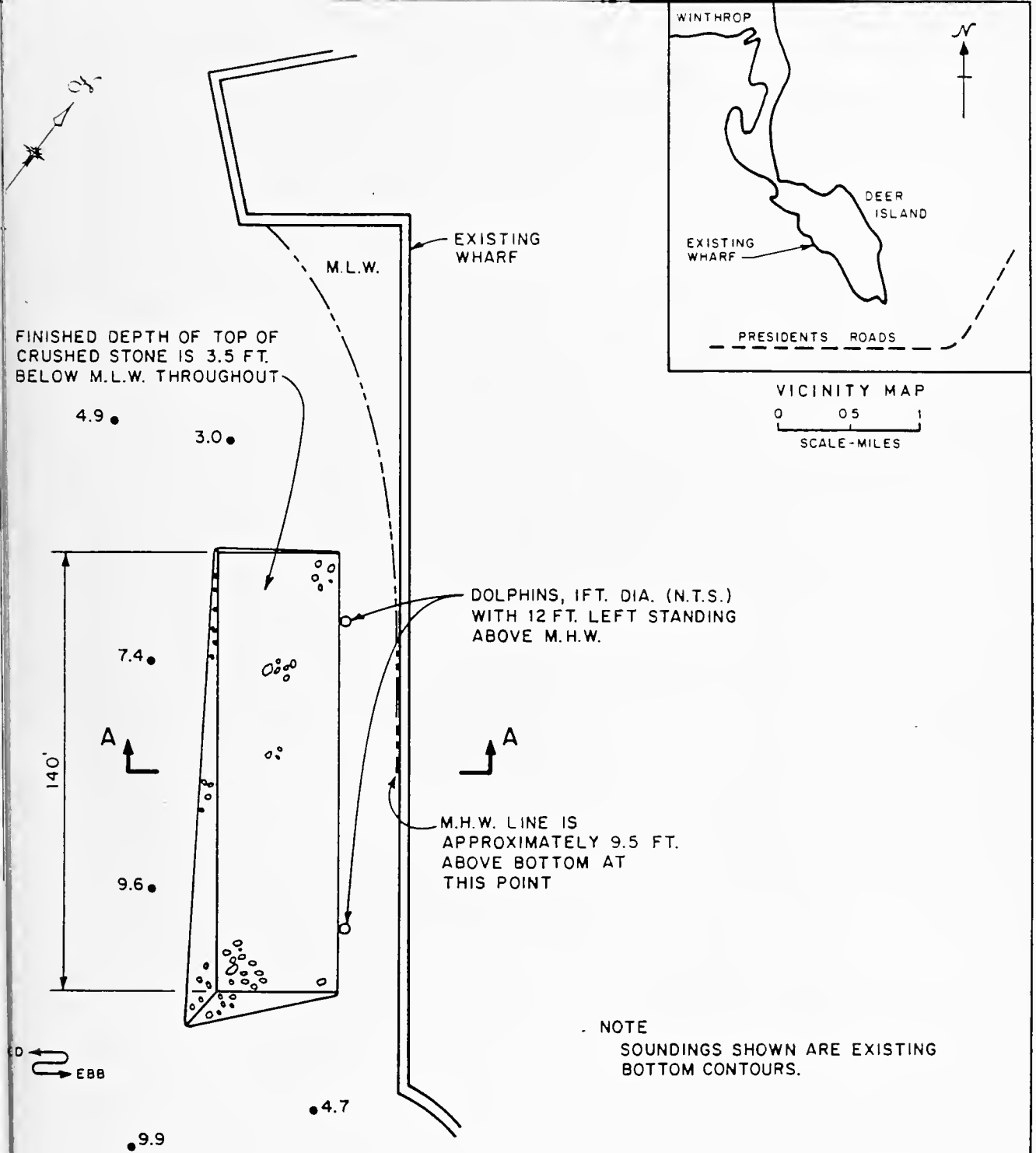
0 5 10

SCALE - FEET

PREPARED BY:
Stone & Webster
Engineering Corp., Inc.
Boston, MA

BARGE UNLOADING AREA
CITY OF: BOSTON
COUNTY OF: SUFFOLK
AT: DEER ISLAND,
BOSTON HARBOR
PROPONENT: MASS. WATER RESOURCES AUTHORITY

SHEET A AUGUST, 198



::
E TEMPORARY FACILITY
–LOAD 17,000 YD^3 OF
ROM BARGES

T PROPERTY OWNER:
WEALTH OF MASS.

PLAN VIEW
0 25 50
SCALE-FEET

PREPARED BY:
Stone & Webster
Engineering Corp., Inc.
Boston, MA

BARGE UNLOADING AREA
CITY OF: BOSTON
COUNTY OF: SUFFOLK
AT: DEER ISLAND,
BOSTON HARBOR
PROPONENT: MASS. WATER
RESOURCES AUTHORITY
SHEET B AUGUST, 1987

APPENDIX A

SECONDARY TREATMENT FACILITIES PLANNING PROJECT - SUMMARY STATUS

1.0 INTRODUCTION

The Massachusetts Water Resources Authority (MWRA) is currently performing engineering and environmental evaluations to plan, design, and construct a secondary wastewater treatment facility of approximately 500 MGD average capacity (approximately 1200 to 1300 MGD peak capacity) on Deer Island to serve the needs of the communities served by the MWRA. The Facilities Planning documents for this project, including Environmental Reviews, are currently being prepared. The purpose of this summary status is to provide current information developed to date on this project, which focuses on the potential plans which will necessitate reviews by the U.S. Army Corps of Engineers (COE) under Section 10 of the Rivers and Harbors Act of 1899, and under Section 404 of the Clean Water Act.

The following sections summarize background information and the status of the secondary treatment facilities planning concepts. For those project elements where the selection of a recommended concept is not yet available, the alternative concepts are described.

The secondary treatment project has been subdivided into four major components, for which individual Environmental Information Documents/Environmental Impact Reports (EID/EIR) are being prepared. The four components, and the final EID/EIR submittal dates, are summarized below:

- Early Site Preparation - Involves the movement of Deer Island soils preparatory to construction of primary treatment facilities; demolition and removal of certain structures, such as concrete bunkers associated with Fort Dawes; removal and final closure and disposal of existing grit and screenings on Deer Island; provision of off-island utilities supply to support construction and interim facilities on Deer Island. The draft and final EID/EIR submittal dates for Early Site Preparation are August and October, 1987, respectively.

- Inter-island Wastewater Conveyance System - Involves the construction of a tunnel between Nut Island and Deer Island to convey wastewater from the South System to Deer Island; and the construction of a pump station on Deer Island to receive South System flows and pump them to treatment facilities on Deer Island. The draft and final EID/EIR submittal dates for the Inter-island Wastewater Conveyance System are August and December, 1987, respectively.

- Treatment Plant - Involves the development of a Deer Island site plan, selection of treatment plant design, and the construction of the wastewater treatment plant, support facilities, and provision of utilities to support the treatment works. Also included in

this project component is the development of a Nut Island site plan which will provide for removal of the existing wastewater treatment facilities, and construction of a new headworks facility which will provide preliminary treatment for South System wastewater prior to conveyance to Deer Island. Draft and final EID/EIR submittal dates for the Treatment Plant are September, 1987, and February, 1988, respectively.

- Outfall Facilities - Involves the construction of pumping facilities if required, a tunnel, pipeline or some combination thereof, and outfall diffuser for the discharge of secondary-treated effluent. These documents will also address the impacts associated with the discharge of primary effluent during the 1995-1999 period of construction for the secondary treatment facilities. The draft and final EID/EIR submittal dates for the Outfall Facilities are September/November and December, 1987, respectively.

The following project description represents the status of ongoing evaluations. All findings and recommendations as presented in Facilities Planning and Environmental Review Documents are subject to State, federal, and public review.

The geographical areas covered by this project include Deer Island, Nut Island, the inter-island wastewater conveyance tunnel, outfall study areas, and areas which may be affected by a discharge system; these areas are shown on the Vicinity Map, Sheet 1, attached. Other areas affected by the project but unknown at this time include utility routes (electricity, water, gas, and telecommunications) across the harbor and over land, and excavation disposal areas on land or in the ocean.

2.0 BACKGROUND

The facilities planning and environmental review efforts described in this appendix are part of Phase II for facilities planning for future wastewater treatment works to serve the 43 member communities which comprise the Metropolitan Sewerage District (MSD). Sewerage services for the MSD were formerly provided by the Metropolitan District Commission (MDC) and are now provided by the Massachusetts Water Resources Authority (MWRA). Phase I facilities planning and environmental review occurred during the early 1980's, the culmination of which led to a decision to consolidate primary and secondary treatment facilities at Deer Island. Concurrently, with the completion of Phase I facilities planning and environmental reviews, the Federal Court mandated a schedule of events for each of the major project elements.

The remainder of this section provides background information on Phase I facilities planning and the present court schedule for treatment plant construction activities.

Phase I Facilities Planning/Environmental Reviews

At the close of December, 1984, the Environmental Protection Agency, Region I, the Executive Office of Environmental Affairs, Commonwealth of

Massachusetts, and the MDC, together completed and issued a Supplemental Draft Environmental Impact Statement/Report on Siting of Wastewater Treatment Facilities for Boston Harbor. This document described and evaluated alternative courses of action.

In November, 1985, the MWRA completed and issued a Final Environmental Impact Report on Siting of Wastewater Treatment Facilities for Boston Harbor. This document presented the MWRA's preferred alternative and documented the decision process. On December 9, 1985, a Certificate of the Secretary of Environmental Affairs on the Final Environmental Impact Report was issued. Thereafter, the G.L.C. 30 Section 61 Findings by the MWRA on the selection of Deer Island as the Site for Wastewater Treatment Facilities in Boston Harbor was prepared, detailing the decision process and all commitments made for mitigation of project effects.

In December, 1985, EPA Region I completed and issued a Final Environmental Impact Statement on Siting of Wastewater Treatment Facilities for Boston Harbor. In February, 1986 EPA issued its Record of Decision for the project, including mandatory mitigation measures.

Court Mandated Schedule

The treatment plant portion of the total project, including the treatment works, outfall, and inter-island wastewater conveyance system, has a court date for completion of the draft facilities plan in September, 1987 and draft Environmental Impact Report in October, 1987. The final facilities plan and final EIR are scheduled for December, 1987 and February, 1988, respectively.

As noted in the Introduction, however, facilities planning and environmental review for the treatment plant has been subdivided by the MWRA and MEPA Office into four major, independent components. The MWRA has accelerated the Early Site Preparation and Inter-island Conveyance System draft/final planning completion dates, in an effort to accelerate the design and start of construction of these elements.

The court dates for construction-related activities for the treatment plant, outfall and inter-island conveyance system are as follows:

Initiate construction of new primary treatment facilities	December, 1990
Complete construction and commence operation of new primary treatment facilities	July, 1995
Initiate construction of outfall	July, 1991
Complete construction of outfall	July, 1994
Initiate construction of under-harbor transmission tunnel	April, 1991
Complete construction of under-harbor transmission tunnel	December, 1994

Initiate construction of secondary treatment facilities	During 1995
Completion of secondary treatment facilities	1999

3.0 EARLY SITE PREPARATION

Early site preparation includes activities such as clearing, demolition, and earth movement, that are necessary to prepare areas on Deer Island for subsequent phases of construction of the primary treatment facilities. Due to the unique characteristics of this project site, it is necessary to expedite this phase of work to provide for its timely completion, thereby ensuring that project milestones are achieved. Refer to Sheets 2 and 3, which provide existing Deer Island topography and land ownership, respectively. Later phases of site preparation associated with existing plant demolition and secondary treatment facility construction are included in Section 4.0, Treatment Plant. A summary outline of the project phases and goals for this phase of site preparation follows:

Grit and Screenings

The existing onsite disposal areas, containing approximately 100,000 cy of grit and screenings must be excavated, possibly treated by chemical stabilization, and disposed onsite in an area designated for future landform development. To mitigate odor potential, it is anticipated that this work will be done during the winter. This work may start as early as 1988/1989 extending to the winter of 1989/1990.

Existing Utilities

The existing treated effluent reservoir on the drumlin which provides cooling water to the diesel engine generators must be replaced with a new cooling system. Also, the existing outfalls must be protected against heavy construction equipment movement and material storage. Interim electrical power and potable water will be provided.

Demolition

Existing structures and foundations will be demolished and removed in a phased approach as construction progresses. A goal is to utilize the classified portion consisting of concrete, bricks, etc., as onsite fill in future landform areas.

Drumlin Removal

The first phase of drumlin removal is in the area of the new primary treatment facility. This material must be removed by January, 1991, down to a working platform elevation at the bottom of the new primary treatment clarifiers. The second phase, including excavation of the remainder of the main drumlin and other areas necessary for secondary treatment facility construction, is covered in Section 4.0. A goal is to maximize the use of this material onsite, by temporary stockpiling excavated materials until areas designated for landform development become available. Approximately

3.5 to 4 million cy of earthen material will be excavated overall, during both construction phases.

Landform Development

A goal is to maximize the use of perimeter areas of the island for landform development with emphasis on early construction of a landform at the northern end of the island to serve as a visual and noise buffer between Winthrop and site construction activities. Landforms will be constructed primarily of excavated drumlin materials with smaller quantities of classified demolition debris and grit and screenings. For both phases of site preparation, a total of approximately 2.5 to 3 million cy of earth, classified demolition debris, and grit and screenings will be utilized as fill and landform material.

Offsite Material Disposal

The final site planning concept which is selected for the treatment plant and the finished grade for the plant will define the total quantity of material which can be used onsite. A range of approximately 100,000 to one million cy of earth and demolition debris will be transported offsite for use and/or disposal. Disposal alternatives being considered for this material, as well as for the disposal of rock tunneling spoil produced during construction of the inter-island tunnel and effluent tunnel (e.g., approximately 600,000 to 2,200,000 cy, total, as described in Sections 4.0 and 6.0), include the following:

- Disposal within the COE Foul Area Disposal Site, located 14.5 NM offshore, as shown on the attached Sheet 4;
- Disposal at any other federal marine disposal sites which may be designated later;
- Upland disposal on Deer Island, to the extent practical;
- Use of these materials for fill by any other project.

Transfer of excess spoil material from Deer Island will be by barge, to either a marine disposal site, or to an off-island location(s) to be identified later.

Environmental Evaluations

Onsite studies are currently underway to provide a definition of the extent of an historical cemetery on Deer Island, and to evaluate the impacts of site preparation on this resource. Section 106 Review of the Deer Island cemetery, and of the four structures on Deer Island determined to be eligible for the National Register are being conducted under the planning for the treatment plant (Section 5.0). Other environmental analyses which are being performed to evaluate impacts of site preparation include:

- Noise impacts, and noise control methodology;
- Potential for odor production, and mitigating measures;

- Traffic impacts resulting from land and marine shipment of materials and from construction worker traffic;

- Impacts to terrestrial ecology.

4.0 INTER-ISLAND WASTEWATER CONVEYANCE SYSTEM

The inter-island wastewater conveyance system will be designed to convey by gravity, a peak wastewater flow rate of approximately 300 to 400 MGD from Nut Island to Deer Island. Preliminary design of the inter-island wastewater conveyance system has resulted in the following conceptual elements:

- A 16 ft diam. vertical shaft, located on Nut Island, which will receive South System wastewater pretreated by a new headworks facility.

- An approximately five mile long tunnel which slopes downwards from an approximate elevation of -200 ft MSL at Nut Island, to an approximate elevation of -400 ft at Deer Island. The tunnel will be 12 ft diam., and will have a one foot thick reinforced concrete liner. The alignment of the tunnel is shown on Sheet 5, attached.

- A 16 ft diam. Deer Island vertical shaft which will receive the discharge from the inter-island wastewater tunnel.

- A new Deer Island pump station which will lift the South System wastewater to the new primary treatment facility on Deer Island. The pump station will be provided with six, 57,000 gpm pumps, which include two spare pumps.

In developing the foregoing concept, several alternative hydraulic conveyance concepts were considered, and rejected for engineering and cost reasons. An alternative approach considered for the inter-island wastewater conduit consisted of a combined pipeline/tunnel: A pipeline constructed on the harbor bottom would connect Nut Island with a vertical shaft located at Long Island. The Long Island access shaft would discharge South System wastewater to a tunnel which would cross Presidents Roads channel and discharge to a vertical shaft on Deer Island. The pipeline alternative will be rejected based on environmental and cost considerations; however, the final recommendation will be subject to Facilities Planning/Environmental Review and approval.

Construction of the inter-island wastewater tunnel and shafts will produce an estimated 170,000 cy of argillite rock spoil material. As noted for the Early Site Preparation component for this project, excess soils and tunnel spoil will be produced by the project, relative to the quantity which can be practically used on Deer Island. A preferred disposal location for the tunnel spoil is the COE Foul Area Disposal Site, located 14.5 NM offshore, as shown on Sheet 4, attached.* Other disposal alternatives being considered include upland disposal, and the potential for the use of tunnel spoil as fill material by other major projects which are also currently in planning phase.

Environmental evaluations for the inter-island wastewater conveyance system are focused on the following areas, associated primarily with construction:

- Marine ecology and water quality impacts associated with marine disposal of tunnel spoil;
- Construction traffic;
- Noise.

5.0 TREATMENT PLANT

The treatment plant facilities which will be located on Deer Island include the following major elements:

- Main pumping station;
- Headworks;
- Primary treatment;
- Secondary treatment;
- Disinfection;
- Administration, operation, maintenance, and other support facilities.

The project is also evaluating the need for power and other utilities; plans for associated power generation facilities, if required, and off-island utility supply for electricity, gas, potable water, and telecommunications are being developed. Also included within the project scope is the provision for a new headworks facility located on Nut Island, and removal of existing Nut Island wastewater treatment facilities. The project is evaluating the adequacy of the remote headworks located at Ward Street, Roxbury; Chelsea Creek, Chelsea; and Columbus Park, South Boston.

Construction of the secondary treatment plant includes site preparation work subsequent to the early, phased activities described in the Early Site Preparation section. These later site preparation activities are likely to result in the production of excess excavated soils, demolition material, and tunnel spoil. As indicated previously, marine disposal at the COE Foul Area or other federally designated marine disposal sites*, upland disposal on Deer Island, or use by other major construction projects, are disposal alternatives which are being evaluated.

Of the major components which comprise the new Deer Island treatment plant, the primary and secondary process elements account for the largest land areas. Currently, engineering evaluations have screened numerous primary and secondary process alternatives, and have concluded that the following process concepts should be retained for further consideration:

- Stacked/Unstacked Clarifiers - Total land requirements for gravity solids/liquid separation equipment are reduced by providing

two-story, i.e., stacked clarifiers, instead of conventional, one-story clarifiers. Unstacked, partially stacked, and all-stacked clarifier concepts are being considered in site planning and process evaluations.

- Secondary Treatment - Three alternative secondary treatment processes are retained for further evaluation: air activated sludge, oxygen activated sludge, and a coupled system, consisting of both packed tower and activated sludge treatment processes.

Preliminary area requirements have been developed for the treatment facilities. These area requirements have been used in conjunction with environmental constraints, mitigation commitments, and requirements of MWRA's Residuals Management and On-Island Piers projects to prepare conceptual site plans for Deer Island and Nut Island, as shown on the attached Sheets 6, 7, and 8. The conceptual site plans, and associated environmental evaluations are described below.

Deer Island

Sheets 6 and 7, attached, provide conceptual site plans which employ unstacked and stacked clarifier approaches, respectively. Both concepts depict an air activated sludge treatment process as an example of the three alternative secondary treatment processes being evaluated. The land requirements and facility configurations shown are similar for each of the processes being evaluated. Other elements which are common to all concepts include provision for residuals handling and pier facilities, preservation of the historical steam pumping station located near the pier facilities, and utilization of classified demolition materials and excavated soils to create landforms which provide visual screening and potential noise attenuation for adjacent communities. Peak elevation for the new landforms would be at approximately 100 ft, USGS, which would be at the same elevation as the existing central drumlin.

The most apparent difference between the two concepts is the land available for creation of open space at the northern end of Deer Island, which would provide a buffer zone between the treatment plant and Shirley Point residents to mitigate impacts. Alternative site planning concepts which retain the historic Hill Prison are also being evaluated in accordance with federal Section 106 review procedures under the guidance of the Massachusetts Historical Commission. Section 106 reviews are also being performed which will identify the potential for reuse of the remaining historical structures, i.e., the Prison Superintendent's Office and the Farmhouse.

Nut Island

Sheet 8, attached, shows the existing topography of Nut Island. Sheet 9, attached, indicates a conceptual site plan for the location of the new facilities for removal of grit and screenings. An alternative location for the new facilities (shown in Sheet 9) is also being considered in the location of the existing digesters. Evaluations are being performed to select an alternative based on considerations for multiple land use, including open space passive use, and acceptable ways to remove residuals

off of Nut Island. Landform development, to an elevation of 25 to 30 ft, USGS, is being evaluated to provide a buffer.

Environmental Evaluations

Ongoing environmental evaluations which are being performed to aid in the screening of engineering concepts, and to further evaluate the recommended plans are listed below:

- Section 106 reviews of historical structures;
- Field surveys of the historical cemetery located on the northeast portion of Deer Island;
- Characterization of ambient noise, evaluations of noise impacts, control methodology, and mitigating plans;
- Odor and air quality impact evaluations, including volatile organic emissions and necessary controls;
- Assessment of construction traffic impacts;
- Floodplain, wetlands, and coastal zone impact evaluations;
- Impacts to terrestrial ecology, including endangered species;
- Visual aesthetics;
- Land use, including areas potentially affected by the use of buses to transport workers, equipment, and supplies to Deer Island;
- Recreational opportunities associated with land use planning;
- Groundwater hydrology.

6.0 OUTFALL FACILITIES

Preliminary design for the outfall facilities assumes the discharge of secondary treated effluent via an outfall diffuser over a range in flowrates from approximately 290 MGD (dry weather) to a peak flowrate of 1200 to 1300 MGD. Physical oceanographic, marine ecology, and water quality field investigations are being performed to select an outfall site based on consideration of environmental criteria, engineering, and cost criteria. Outfall siting studies are being performed over a broad range of geographic/hydrographic conditions as shown on Sheet 8, attached. Potential outfall locations being considered are generally along a zone which covers Broad Sound out to approximately 9 miles east of Deer Island, and a southernly-oriented zone. Engineering studies are also included for evaluating the existing outfall location, as shown on Sheet 10. While a site just south of the seaward terminus of the north channel, and extending from Presidents Roads was the subject of earlier study, this location is no longer considered viable due to circulation and navigation concerns.

The need for an effluent pumping station is currently being evaluated. Engineering factors which will determine whether an effluent pump station is required, or whether gravity flow may be used for the outfall conduit include the final grade elevation selected for the new secondary treatment facilities, and the distance to the selected outfall site.

Based on the results of evaluations which considered the potential construction impacts to marine ecology and water quality, and engineering and cost considerations, a tunnel/pipeline, or some combination thereof, will be selected for the effluent conveyance system.

The findings of evaluations to date indicate that a tunnel approach would be the construction method of choice. The dimensions on the tunnel will be based on hydraulic considerations including which outfall site is selected, and whether an effluent pumping or gravity flow system is selected. Over the range of hydraulic alternatives being considered, the size of the tunnel varies from an internal diameter of 17 ft using a pumping approach, to a maximum internal diameter of 24 ft, assuming gravity flow to the furthermost outfall site. Construction of the effluent tunnel will produce an estimated range of argillite rock spoil quantities of from 450,000 cy to 1,700,000 cy depending on the diameter and distance to the selected outfall site. The range in tunnel spoil quantities includes spoil produced by construction of a 15 ft by 30 ft vertical access shaft on Deer Island. The depth of the tunnel will be within a range of from -300 ft to -500 ft MSL. It is possible that tunnel construction will necessitate the construction of an intermediate shaft within the zoned area labelled "tunnel alignment," on the attached Sheet 10.

The outfall diffuser will be approximately 1500 meters long. Alternative outfall diffuser designs are currently being evaluated which employ different construction methods. Alternative concepts being evaluated differ physically by the need for dredging along the diffuser axis. Disposal alternatives for effluent tunnel spoils, and if required, dredging spoils from the outfall, include use of the COE Foul Area Disposal Site or other designated marine sites.*

Similarly to other project disposal needs, upland disposal of tunnel spoil on Deer Island, as well as utilization of tunnel spoil by other projects are alternatives being considered.

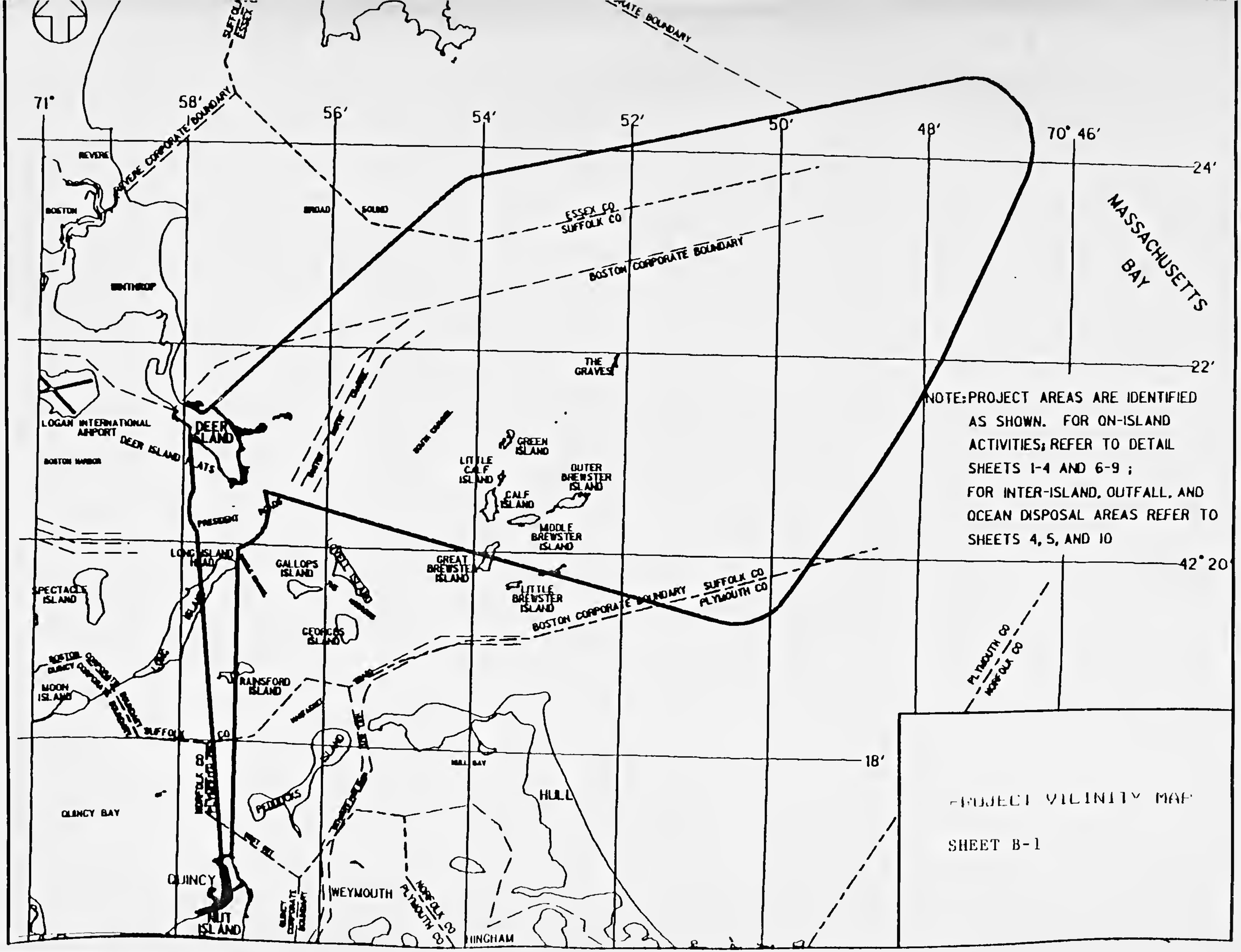
Environmental studies are focused on outfall site selection, determining construction-related impacts associated with the tunnel and outfall diffuser, and in predicting operational impacts resulting from the discharge of primary effluent on an interim basis, and over the long term, of secondary treated effluent.

Preliminary physical oceanographic field studies were performed during the summer of 1986; field studies in the areas of marine ecology, water quality, and physical oceanography are being performed over the period of January, 1987 through August, 1987. Major elements of these studies include the following:

- Remote reconnaissance of the study areas, using underwater photographic equipment;

- Collection and analysis of water quality samples, finfish, shellfish, macroinvertebrates and benthic infauna;
- Chemical and physical analyses of sediments adjacent to outfall sites;
- Assessment of primary productivity and potential for eutrophication;
- Histopathological and body-burden analyses of toxics in fish;
- Assessment of bioaccumulation of toxics in shellfish;
- Measurement of current speed and direction, bottom topography, and tidal variation.
- Dredge material testing, as required.

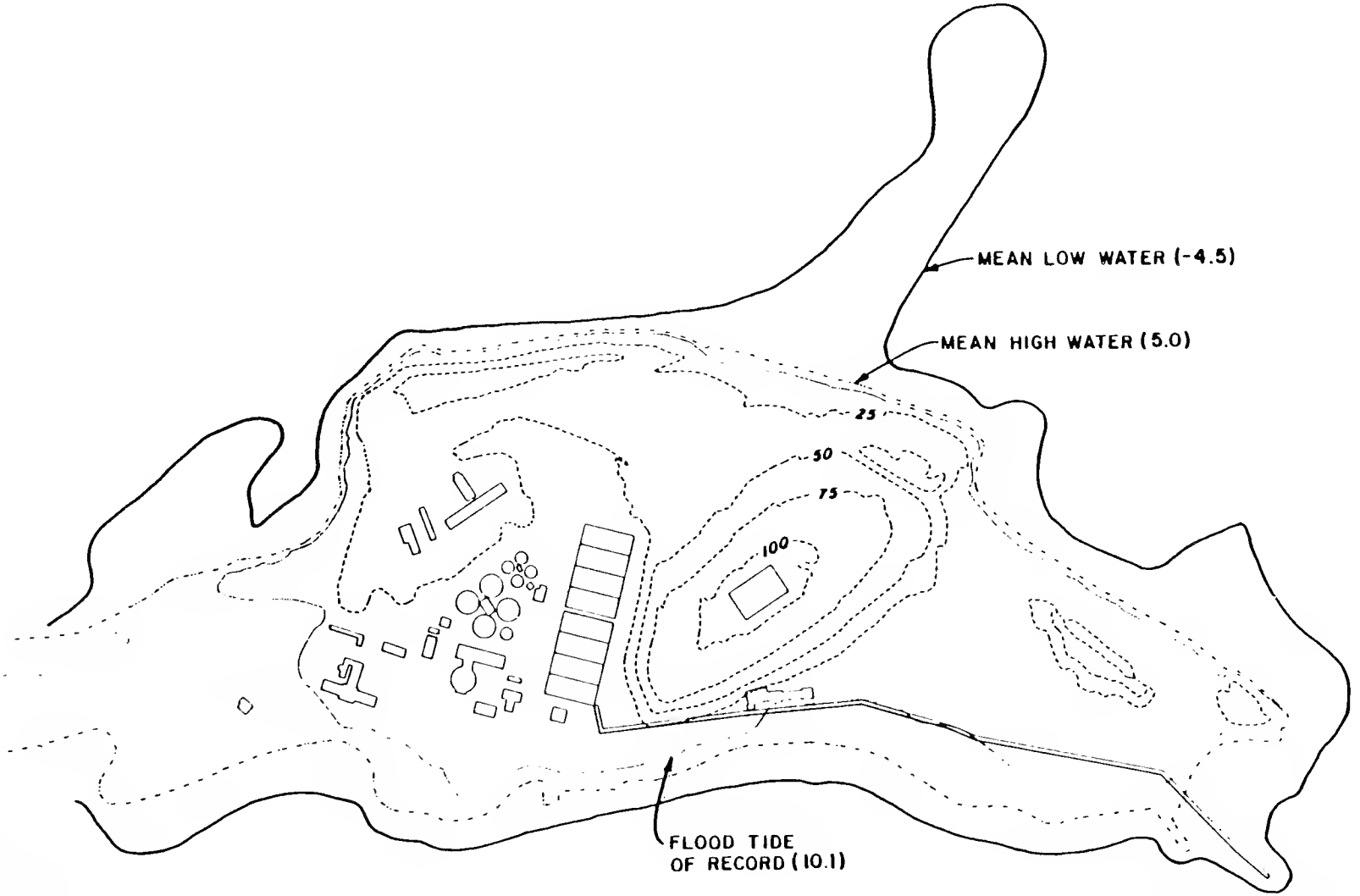
* OCEAN DISPOSAL OF EXCAVATED MATERIALS WOULD REQUIRE A SEPARATE EIS.



NOTE: PROJECT AREAS ARE IDENTIFIED AS SHOWN. FOR ON-ISLAND ACTIVITIES; REFER TO DETAIL SHEETS 1-4 AND 6-9 ; FOR INTER-ISLAND, OUTFALL, AND OCEAN DISPOSAL AREAS REFER TO SHEETS 4, 5, AND 10

PROJECT VICINITY MAP

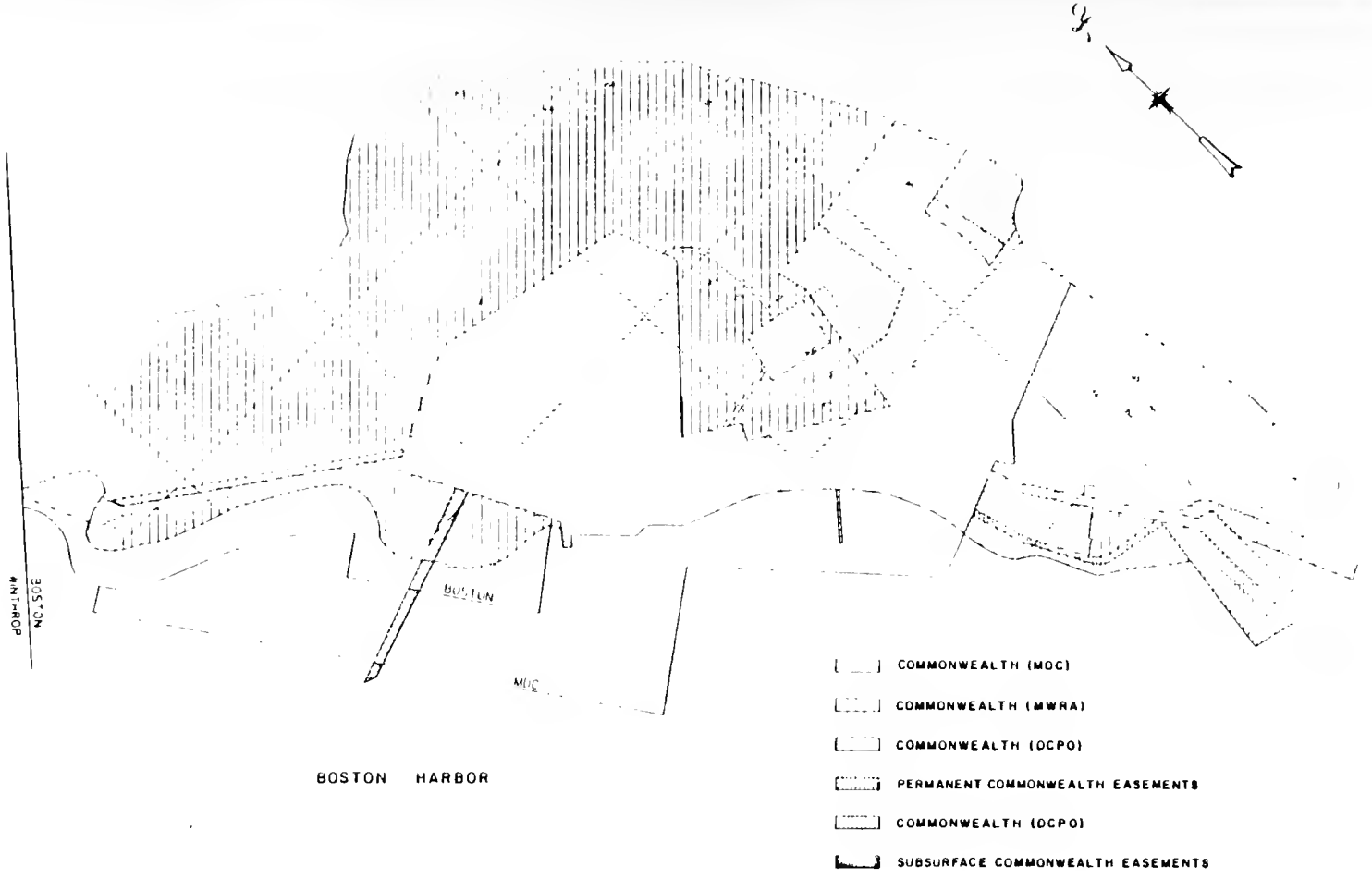
SHEET B-1



NOTE:
ELEVATIONS ARE FT., USGS DATUM.

EXISTING DEER ISLAND
TOPOGRAPHY

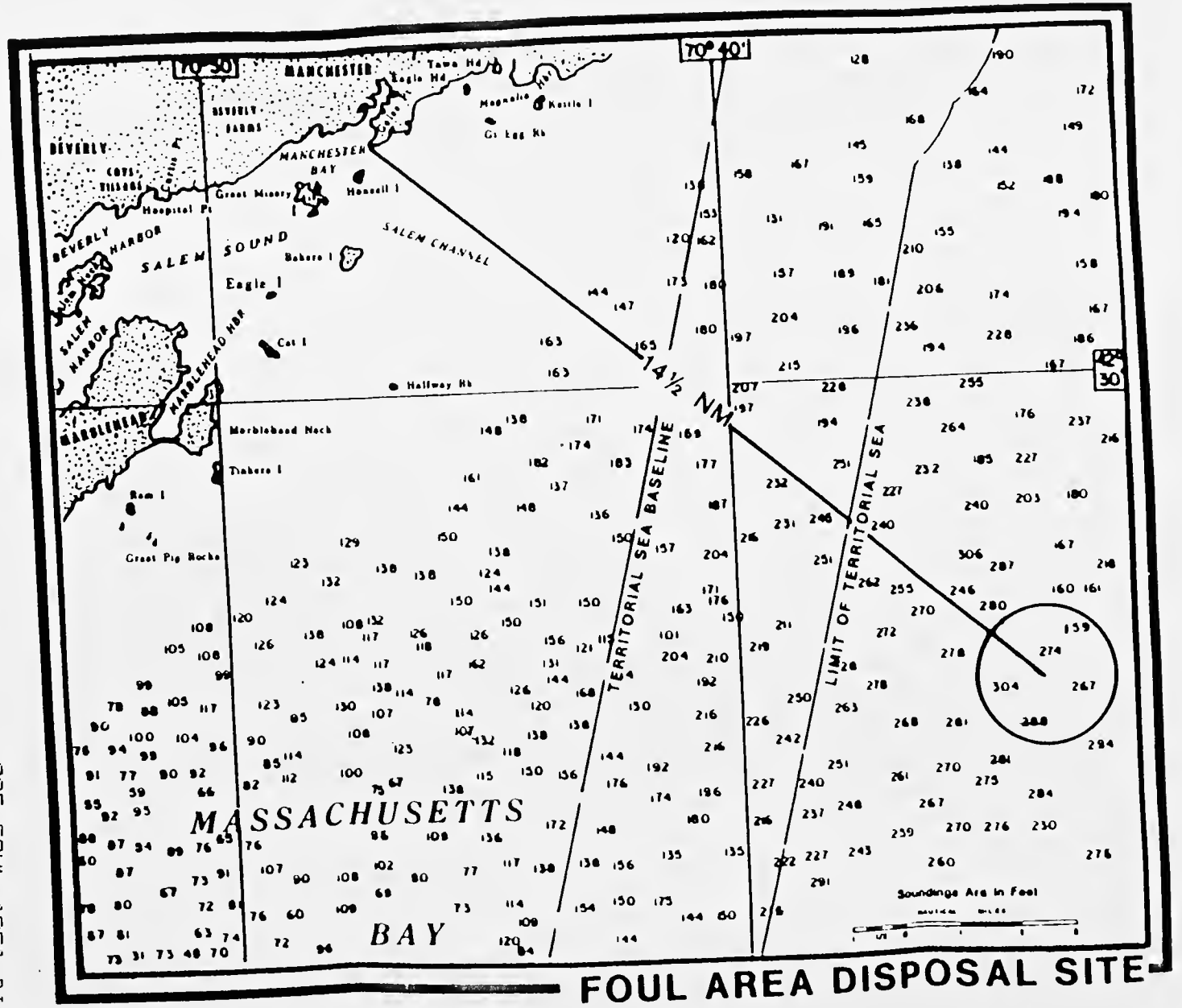
FIGURE B–2



BOSTON HARBOR

DEER ISLAND
LAND OWNERSHIP

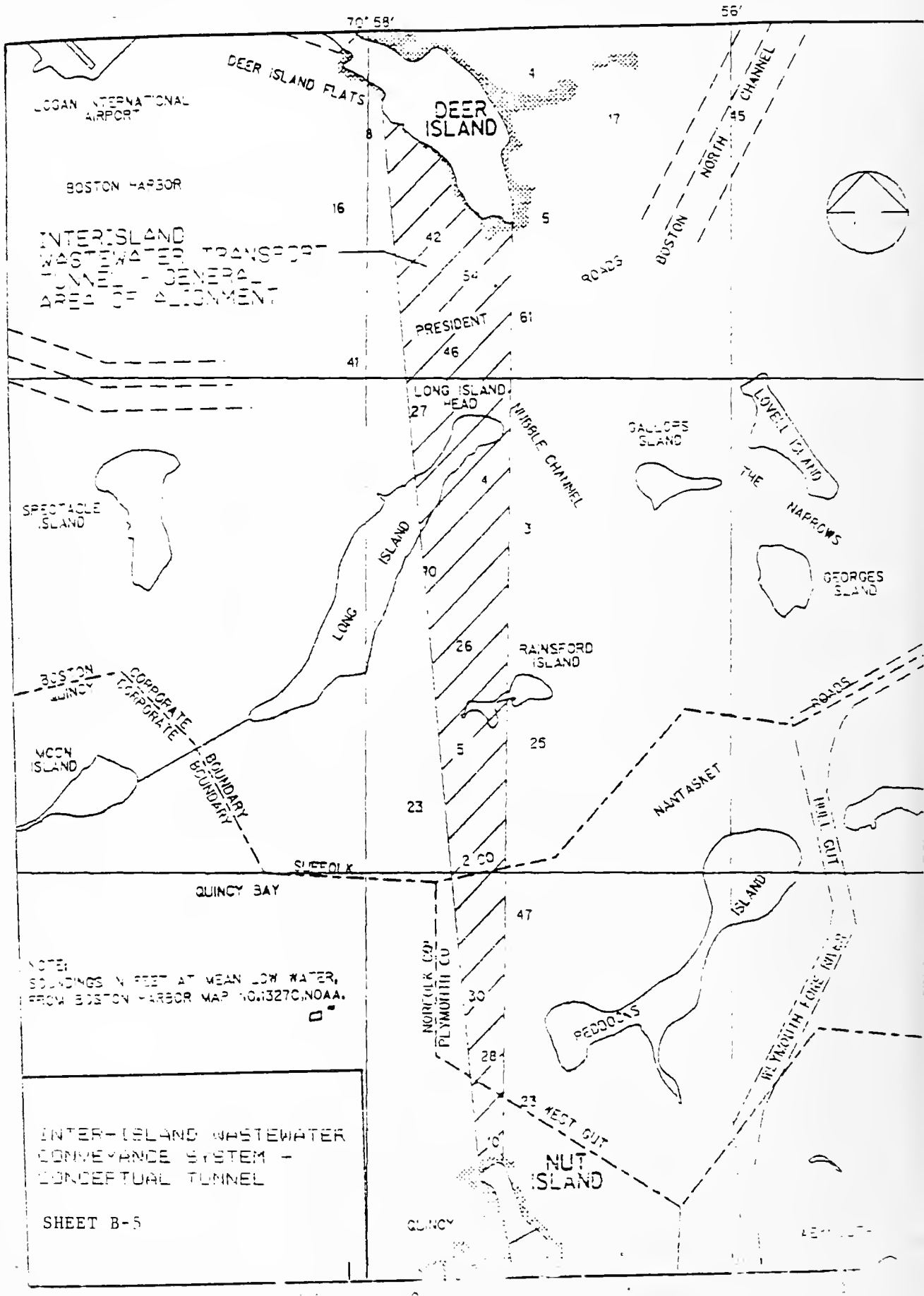
FIGURE B-3

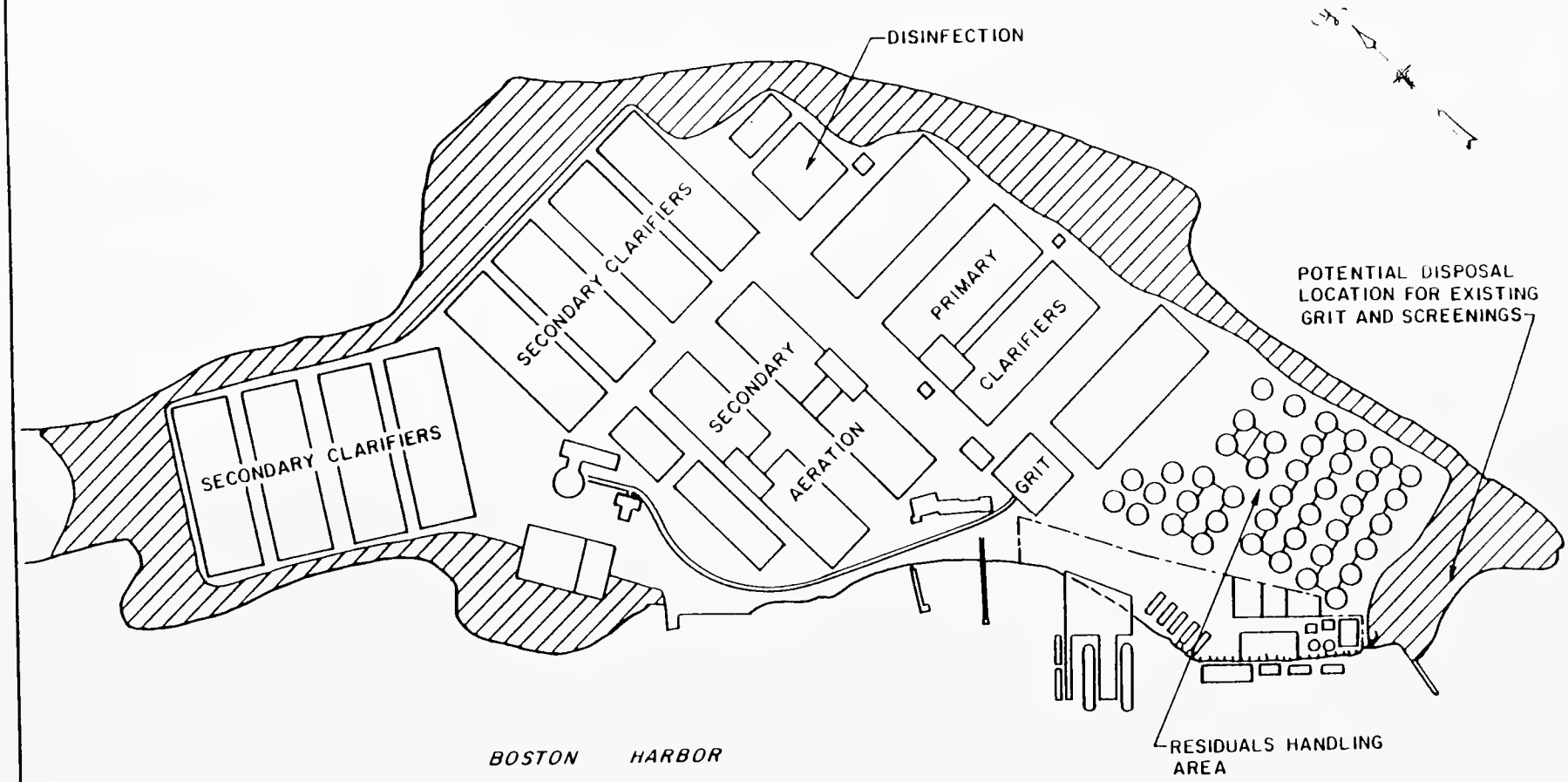


Description: This site is a circular area with a diameter of 2 nautical miles and center at 42°-25.7'N. [illegible] from the center, the Marblehead Tower bears true 282° at 24,300 yards and Baker Island [illegible] overall disposal area.

COE FOUL AREA DISPOSAL SITE

SHEET B-4


70° 58'
56'
DEER ISLAND FLATS
LOGAN INTERNATIONAL AIRPORT
DEER ISLAND
BOSTON HARBOR
INTERISLAND WASTEWATER TRANSPORT TUNNEL - GENERAL AREA OF ALIGNMENT
BOSTON NORTH CHANNEL
ROADS
PRESIDENT
LONG ISLAND HEAD
NUBBLE CHANNEL
GALLOPS ISLAND
LOVELL ISLAND
THE NARROWS
SPECTACLE ISLAND
LONG ISLAND
GEORGES ISLAND
RAINSFORD ISLAND
BOSTON QUINCY CORPORATE BOUNDARY
MOON ISLAND
NANTASKET ROADS
HULL GUT
SUFFOLK
QUINCY BAY
NORFOLK CO PLYMOUTH CO
PEDDOCKS ISLAND
WEYMOUTH FORE RIVER
WEST GUT
NUT ISLAND
QUINCY
NOTE:
SOUNDINGS IN FEET AT MEAN LOW WATER, FROM BOSTON HARBOR MAP NO.13270,NOAA.
INTER-ISLAND WASTEWATER CONVEYANCE SYSTEM - CONCEPTUAL TUNNEL
SHEET B-5

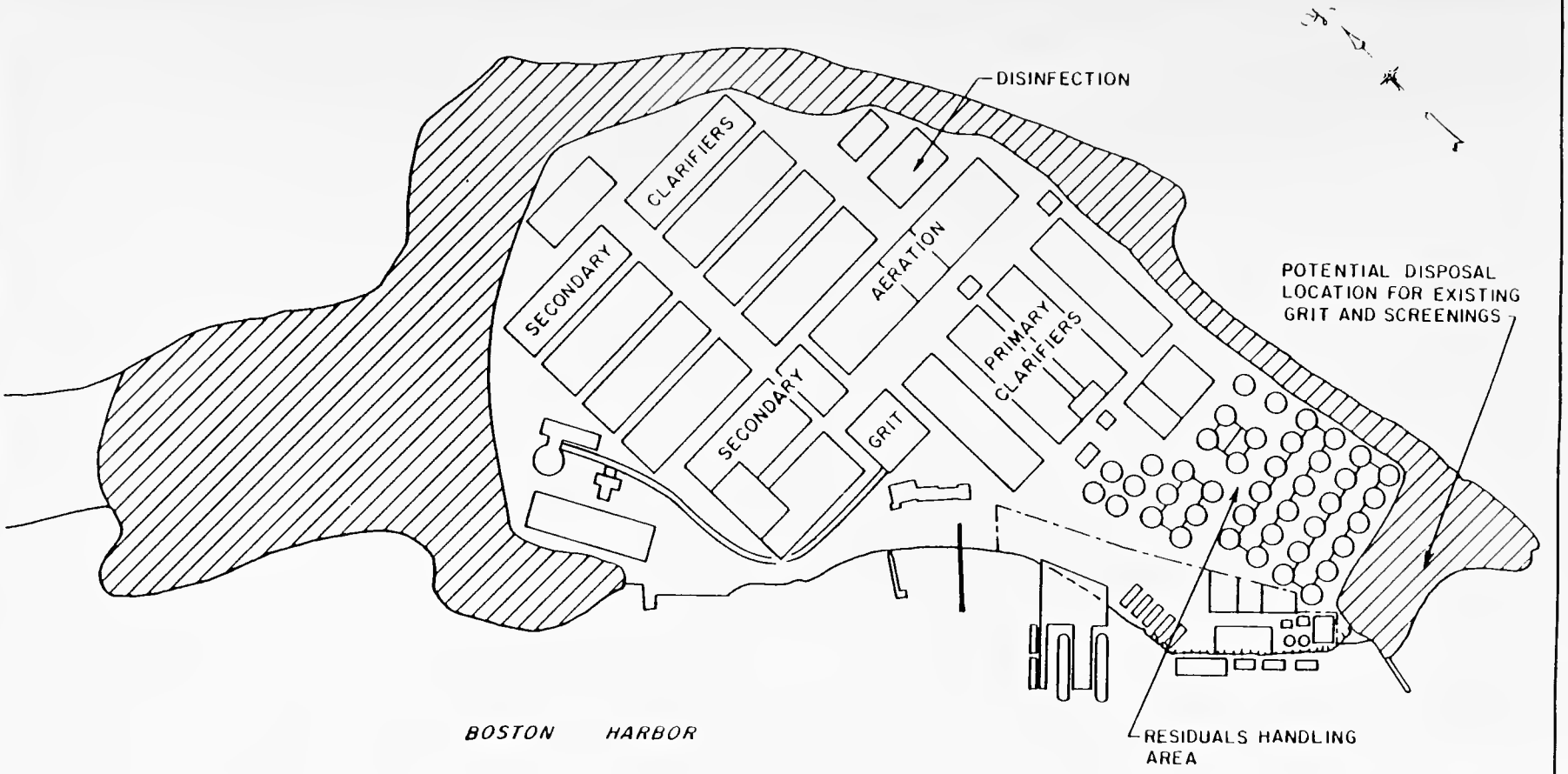


NOTE:
SHADED AREA INDICATES POTENTIAL LANDFORMS AND OPEN SPACE AREAS. MAXIMUM LANDFORM ELEVATION WOULD BE APPROXIMATELY 100FT., USGS. SHORELINE PROTECTION BEYOND THE MEAN HIGH WATER LINE MAY BE REQUIRED

0 500 1000
SCALE-FEET

CONCEPTUAL DEER ISLAND SITE PLAN - UNSTACKED CLARIFIERS

SHEET B-6

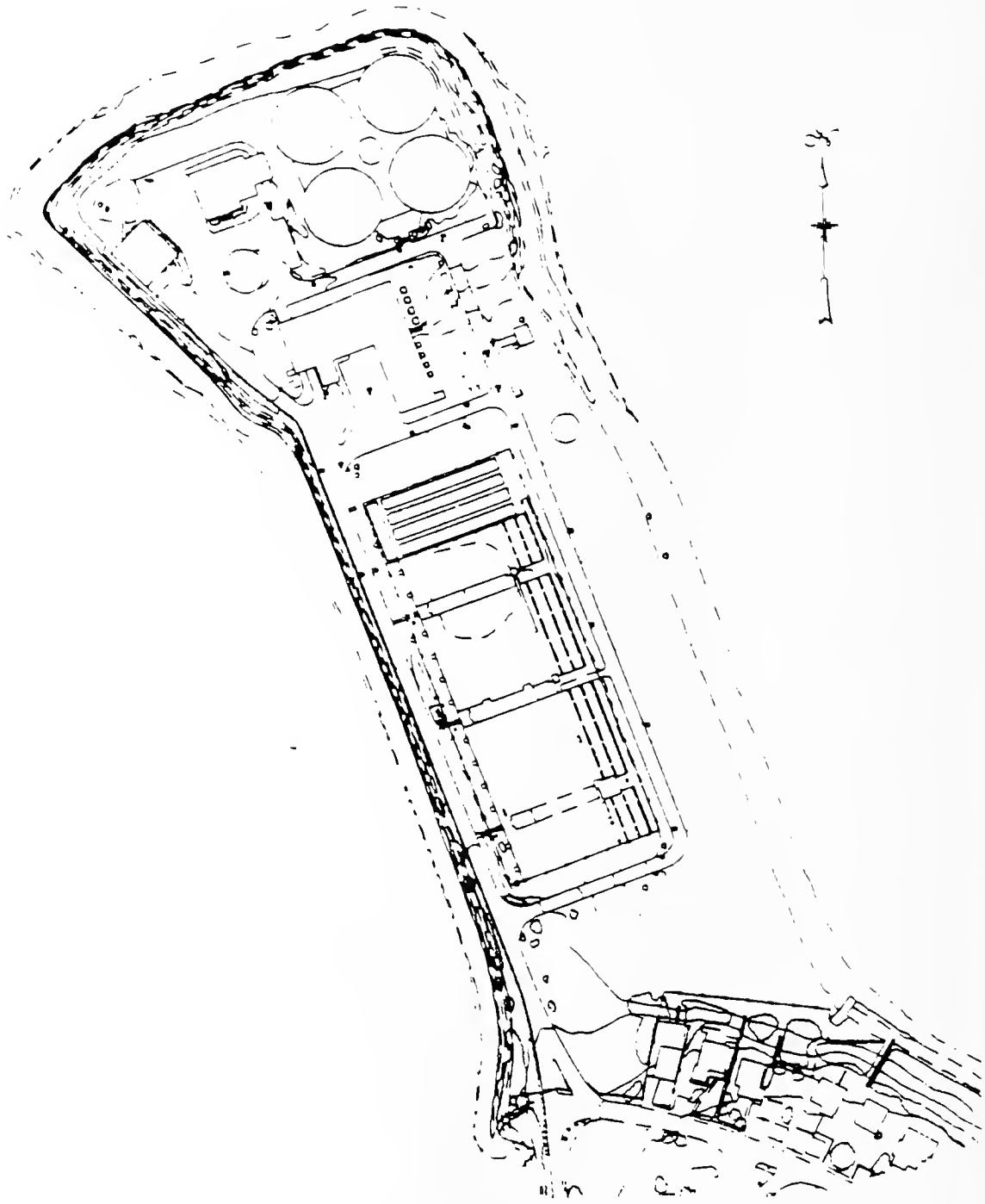


NOTE
SHADED AREA INDICATES POTENTIAL LANDFORMS AND OPEN SPACE AREAS. MAXIMUM LANDFORM ELEVATION WOULD BE APPROXIMATELY 100FT., USGS. SHORELINE PROTECTION BEYOND THE MEAN HIGH WATER LINE MAY BE REQUIRED FOR AREAS TO BE DETERMINED LATER

0 500 1000
SCALE-FEET

CONCEPTUAL DEER ISLAND SITE PLAN - STACKED CLARIFIERS

SHEET B-7

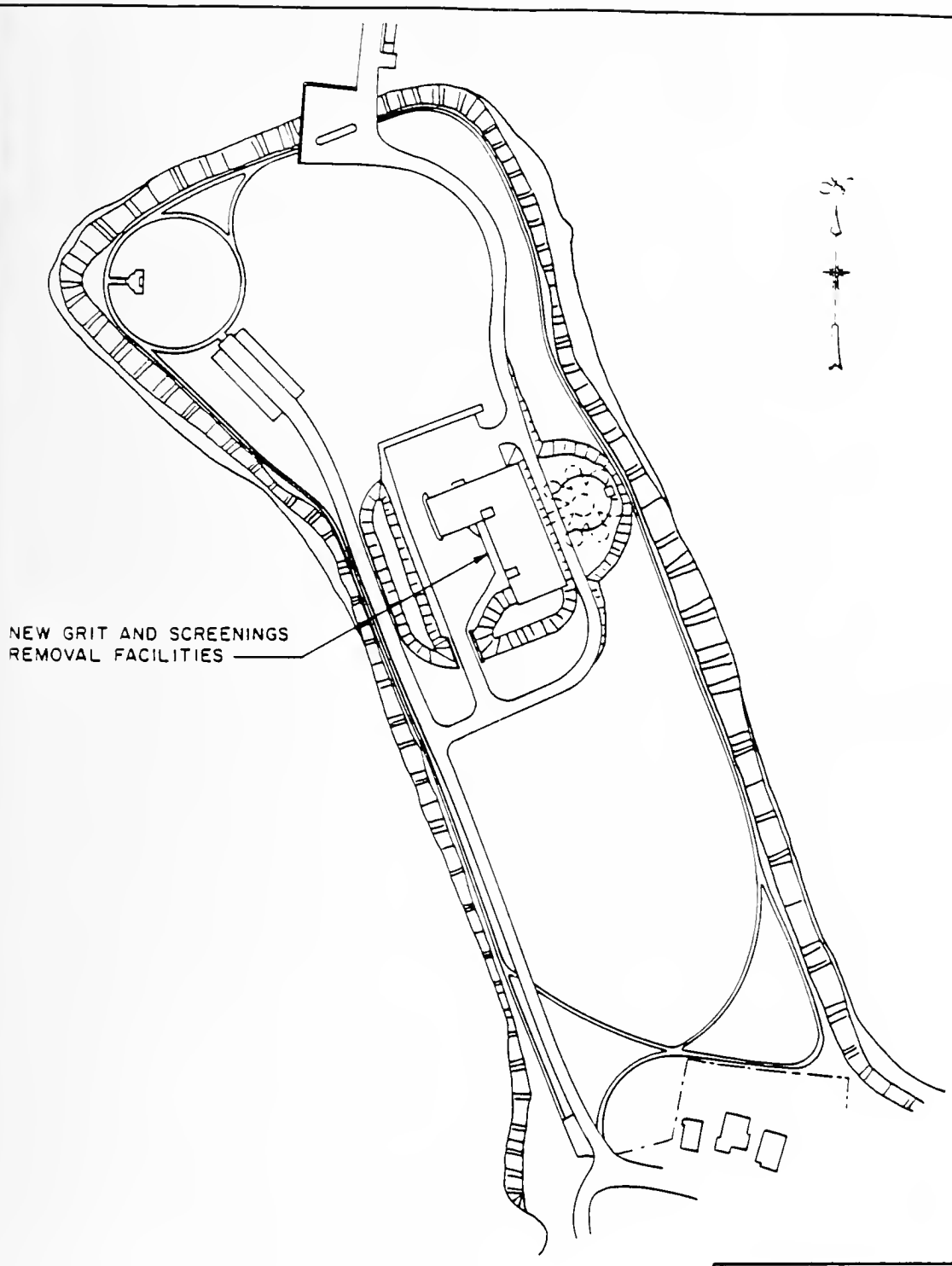


0 200 400

SCALE - FEET

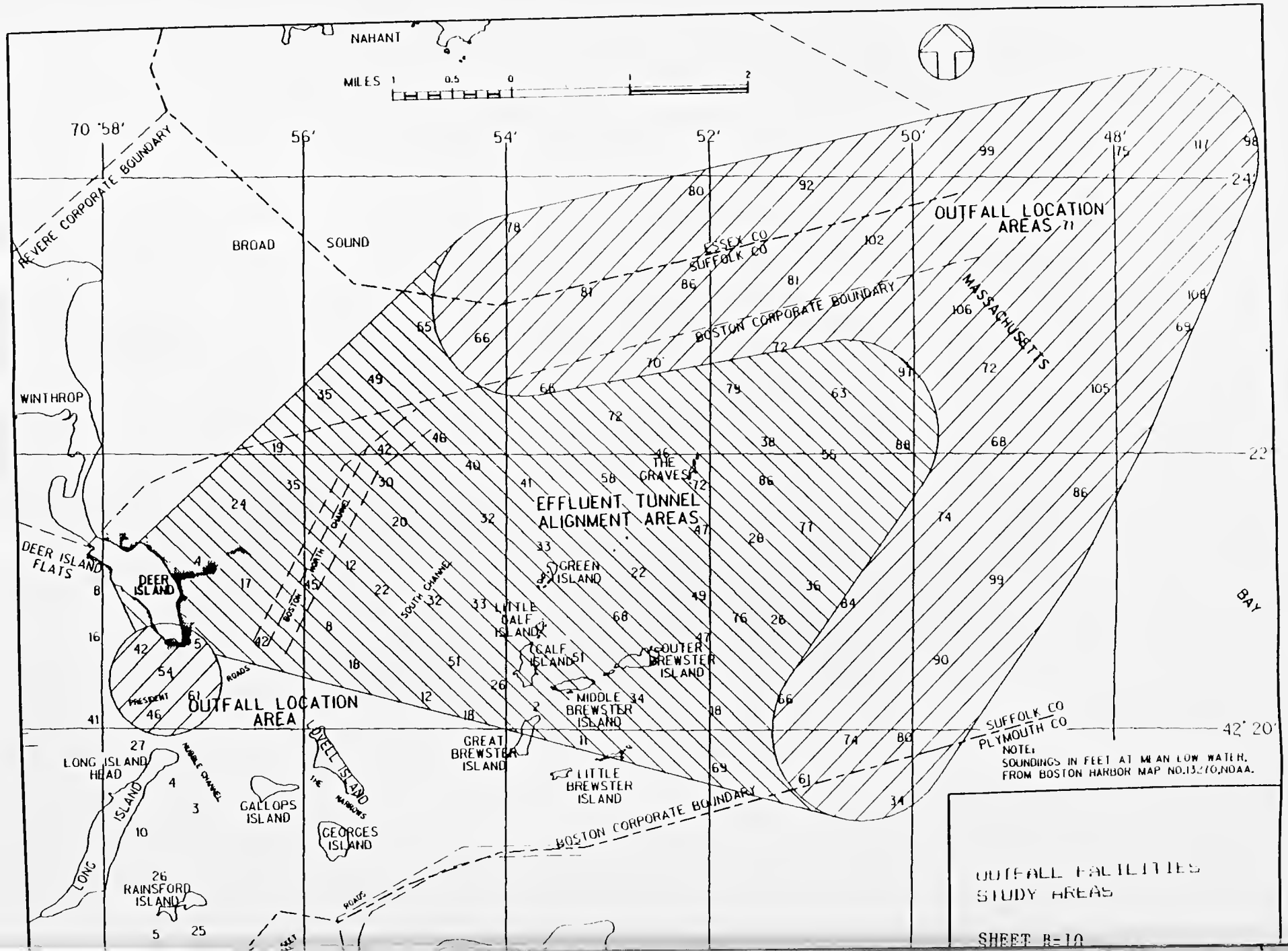
EXISTING NUT ISLAND
TOPOGRAPHY

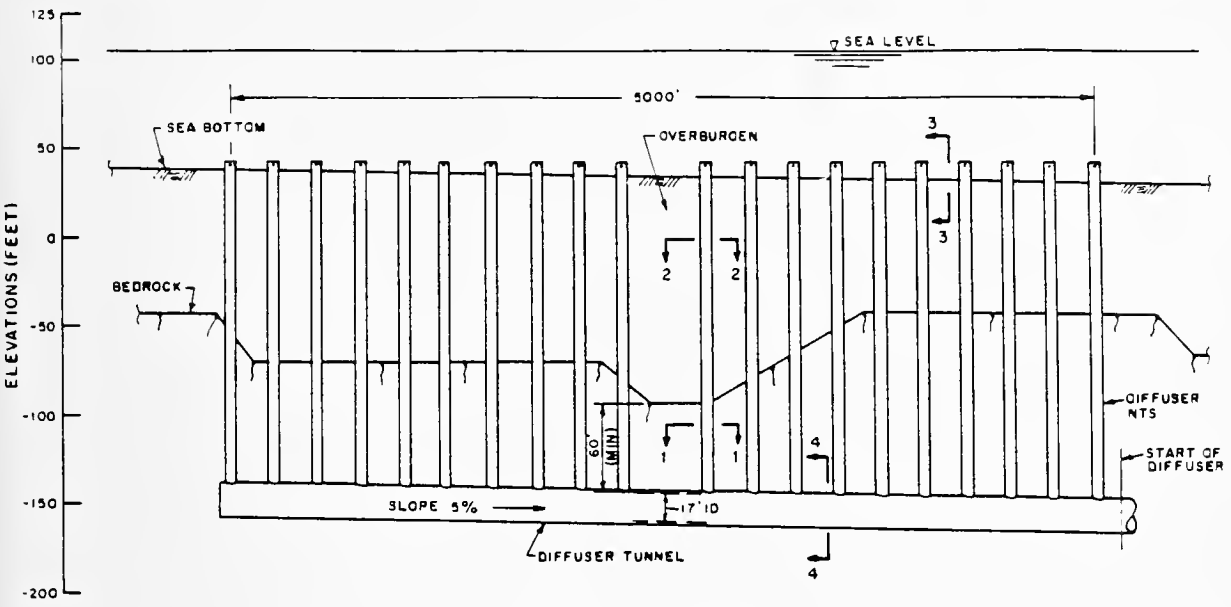
SHEET B-8



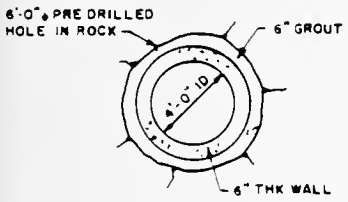
CONCEPTUAL NUT ISLAND
SITE PLAN

SHEET B-9

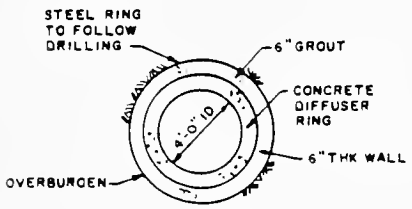

NAHANT
MILES 1 0.5 0 1 2
70° 58'
56'
54'
52'
50'
48'
24'
22'
42° 20'
REVERE CORPORATE BOUNDARY
BROAD SOUND
ESSEX CO
SUFFOLK CO
BOSTON CORPORATE BOUNDARY
MASSACHUSETTS BAY
OUTFALL LOCATION AREAS
EFFLUENT TUNNEL ALIGNMENT AREAS
WINTHROP
DEER ISLAND FLATS
DEER ISLAND
THE GRAVES
GREEN ISLAND
LITTLE CALF ISLAND
CALF ISLAND
OUTER BREWSTER ISLAND
MIDDLE BREWSTER ISLAND
GREAT BREWSTER ISLAND
LITTLE BREWSTER ISLAND
OUTFALL LOCATION AREA
PRESIDENT ROADS
BOSTON HARBOR
SOUTH CHANNEL
LOVELL ISLAND
LONG ISLAND HEAD
LONG ISLAND
NARROWS CHANNEL
GALLOPS ISLAND
GEORGES ISLAND
RAINSFORD ISLAND
SUFFOLK CO
PLYMOUTH CO
NOTE:
SOUNDINGS IN FEET AT MEAN LOW WATER.
FROM BOSTON HARBOR MAP NO.13270,NOAA.
OUTFALL FACILITIES
STUDY AREAS
SHEET B-10



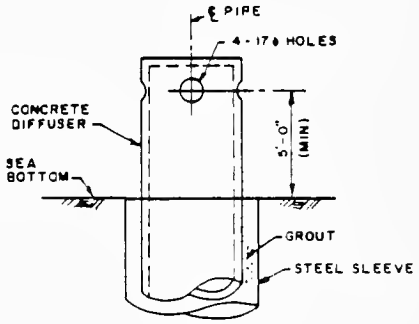
ELEVATION – DIFFUSER



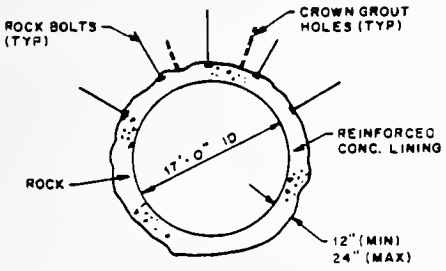
1–1
(NTS)



2–2
(NTS)



3–3
(NTS)



4–4
(NTS)

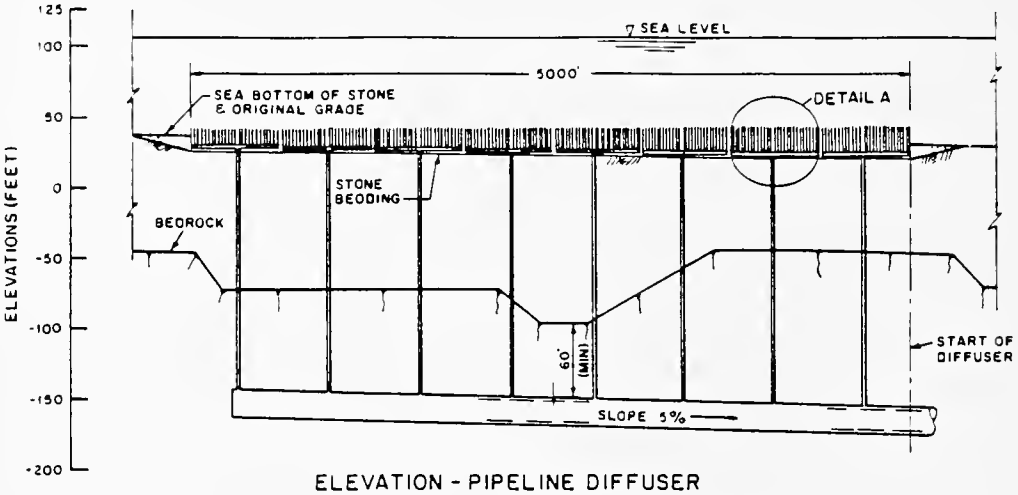
TYPICAL TUNNEL CROSS SECTION

NOTES

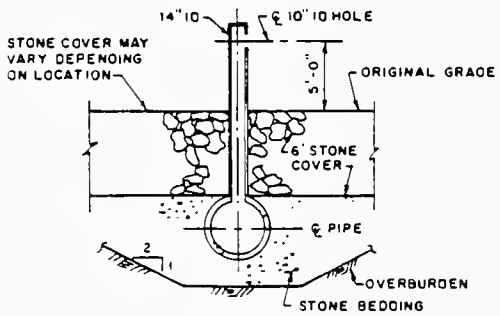
1. 17' ID EFFLUENT TUNNEL AND 17' ID DIFFUSER TUNNEL BASED ON ALTERNATIVE WITH AN EFFLUENT PUMPING STATION.
2. ALTERNATIVE WITHOUT AN EFFLUENT PUMPING STATION REQUIRES 24' ID EFFLUENT TUNNEL AND 24' ID DIFFUSER TUNNEL.

ALTERNATIVE 1
DRILLED RISER DIFFUSER

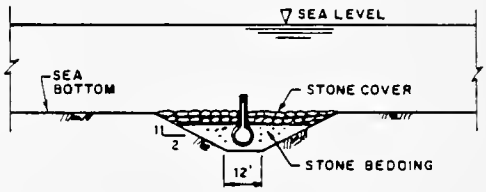
FIGURE B–11



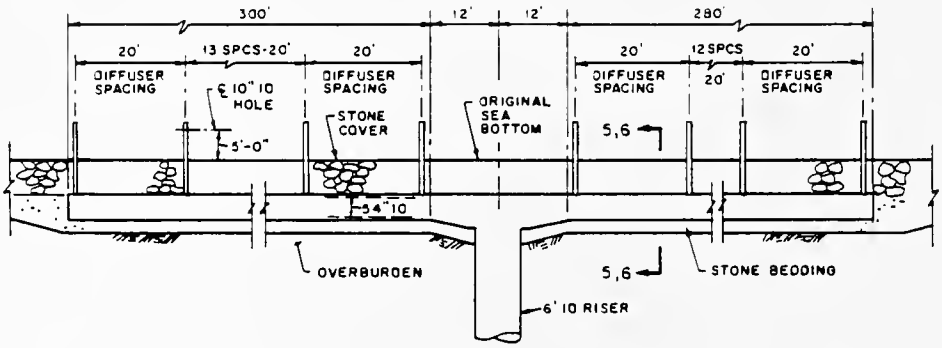
ELEVATION - PIPELINE DIFFUSER



5-5
(NTS)



6-6
(NTS)



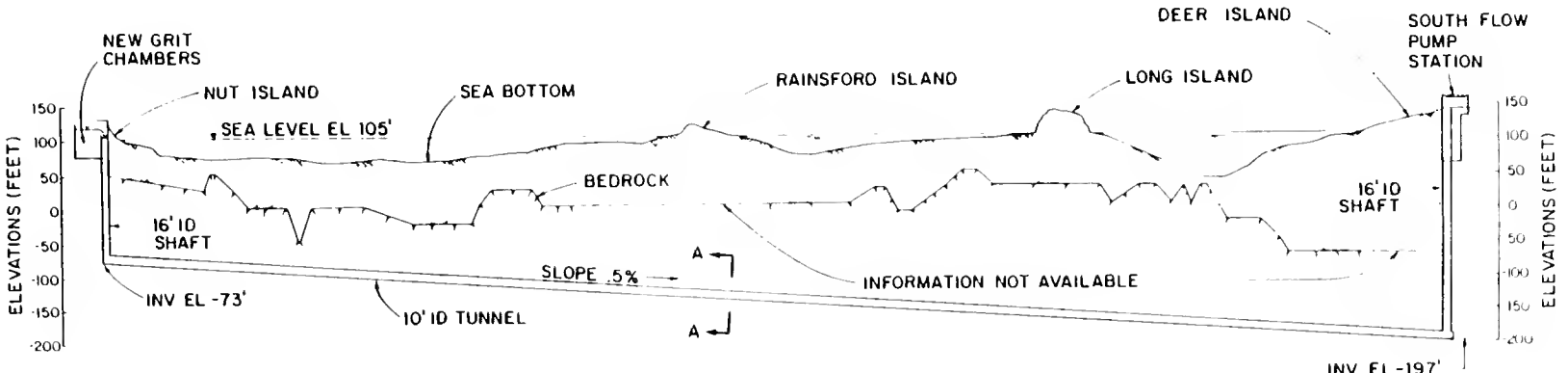
DETAIL A
(NTS)

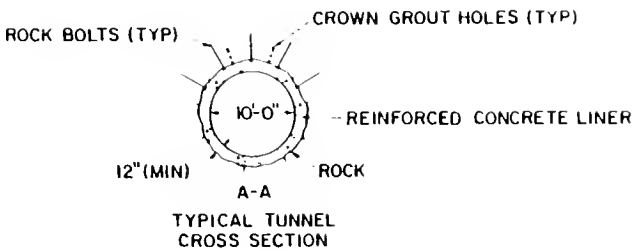
NOTES

1. PIPELINE AND TUNNEL DIAMETERS ARE BASED ON ALTERNATIVE WITH AN EFFLUENT PUMPING STATION.
2. ALTERNATIVE WITHOUT AN EFFLUENT PUMPING STATION REQUIRES A LARGER DIAMETER.
3. SEE ALTERNATIVE 1 FOR TYPICAL RISER SECTIONS (1-1, 2-2) AND TUNNEL SECTION (4-4).

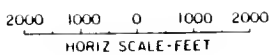
ALTERNATIVE 2
PIPELINE DIFFUSER

FIGURE B-12





TYPICAL TUNNEL CROSS SECTION



INTER–ISLAND
WASTEWATER TRANSPORT
TUNNEL

FIGURE B–13

APPENDIX B

MASSACHUSETTS WATER RESOURCES AUTHORITY

RESIDUALS MANAGEMENT PROGRAM PLANNING

The Authority's residuals management program consists of planning efforts related to interim and long term disposal of sludge, scum, and grit and screenings generated at its wastewater treatment facilities.

The interim and long term planning efforts as they relate to Army Corps of Engineer's permit requirements are discussed in detail below.

LONG TERM RESIDUALS MANAGEMENT PROGRAM PLANNING

The long term residuals management facilities planning (RMFP) effort involves coordination of all study, design, and construction activities related to processing and disposal of residuals generated by all future planned MWRA treatment facilities.

Concurrent with the residuals planning, is the planning for construction of new primary and secondary treatment facilities at Deer Island. The current schedule for construction of new treatment facilities is as follows:

New Primary Treatment Plant - 1995

New Secondary Treatment Plant - 1999

The long term residuals management planning involves handling of the residuals generated by these new facilities through the year 2020. The schedule for completion of long term residuals planning reports is as follows:

Report	Date
Draft - Assessment of Technologies	2/87
Draft - Transportation Assessment	2/87
Draft - Characterization of Residuals	2/87
Draft - Site Screening Analysis	6/87
Draft - Options Analysis (includes recommended plan)	11/87
Final - Options Analysis (includes recommended plan)	4/88

It is impossible to provide details of a preferred residuals management plan at this time. As indicated above, the long term residuals management recommended plan will not be finalized until April, 1988. Currently, only general information on several project alternatives has been developed.

The residuals will be primarily generated at Deer Island. They will be transferred to coastal or inland processing sites via barge or pipeline (land and/or marine based). Final disposal of the residuals will involve landfilling, incineration, or composting. Details of the residuals handling alternatives which have been considered are included in the three RMFP draft reports completed to date (these reports are included as backup documentation with this permit application).

No specific pier or pipeline plans have been developed. If the on-island or on-shore piers described in Appendix A of this permit application are ever considered for residuals transfer, appropriate project changes will be filed with the regulatory agencies. No sites being considered for coastal transfer and/or processing and no inland sites being considered for processing and/or disposal have yet been released to the public.

INTERIM RESIDUALS MANAGEMENT PROGRAM PLANNING

The Authority is required by Federal Court order to achieve land based disposal of all sludge generated at the Deer Island and Nut Island treatment plants as soon as possible but by no later than December 1991. The interim residuals management plan is separate from the long term program and would be implemented even if no new treatment facilities were being constructed.

Current MWRA interim planning consists of a "two-track" approach involving:

1. Public Sector Options - Evaluation of all long term sludge management plans (being developed as part of the Residuals Management Facilities Planning (RMFP) effort) for applicability to the interim 1991 goal; and

2. Private Sector Options - Assessment of privatization options through requests for qualifications and priced proposals from private parties interested in providing full sludge management services to the Authority.

At this time, it appears that the privatization planning track is much more likely to provide a land based sludge disposal option by the December 1991 deadline than is the public sector evaluation. The private sector participants have the advantage of greater ease and timeliness in negotiating transfer and disposal site acquisition and in contracting design, construction, and operating services. Therefore, the public sector options, though still being investigated, remain primarily as contingency alternatives.

A request for qualifications from firms interested in providing sludge disposal services was advertised on November 5, 1986.

Twenty three firms responded and nine were shortlisted. The shortlisted firms received a request for priced proposals on May 5, 1987. The current proposed schedule for continuing the private sector evaluation is as follows:

Receive Priced Proposals	- June 26, 1987
Notice of Award	- August 27, 1987
Notice to Proceed	- November 30, 1987

Depending on the nature of the private sector plan selected, it is anticipated that it will take 2 to 4 years for implementation of the sludge disposal program. Any sludge disposal alternative for Deer Island or Nut Island is likely to involve marine transport of liquid digested sludge, off-loading and processing at a coastal site (in Massachusetts or elsewhere), and transport inland to a final processing and/or disposal site.

As part of the Authority's original plan to dispose of sludge at the Easterly Deepwater Municipal Dump Site ("106" Site) off the coast of New Jersey, a report on the impacts of liquid sludge off-loading facilities for Deer Island and Nut Island was developed titled:

Preliminary Draft - Off-Island, Marine Based Liquid Sludge Transfer Project, Draft Environmental Impact Report, January, 1987.

The report examines a range of possible facilities required to effect the transfer of liquid sludge from Deer Island and Nut Island to a marine vessel. Each of the options evaluated in the report has different potential impacts and construction requirements (i.e. some require dredging and some do not). At this time the report has received only preliminary review and does not necessarily reflect the official views of the Authority's Board of Directors.

The facilities considered for Deer Island and Nut Island for off-loading liquid sludge are presented in the attached Figures C-1 through C-6 from the report. The Deer Island facilities will probably include a new pump station, 10 inch diameter land-based force main, bolted steel temporary storage tanks, and several hundred feet of buried, submerged pipeline ending at a mooring dolphin. The Nut Island facilities will probably include a new pump station, several hundred feet of buried, submerged pipeline, ending at a mooring dolphin.

This report was made available to each of the shortlisted firms as a source of data only. The final decision on the on-island and off-island landbased and marine facilities will depend on the plan provided by the contractor selected for the Authority's interim sludge disposal program. The successful contractor will

be responsible for obtaining all necessary federal, state and local permits.

The issue of coastal off-loading and processing sites is not addressed in the report. Sludge management plans contained in the qualification packages of the nine shortlisted private firms indicate the possible use of both local and out of state facilities.

ATTACHMENTS

Figures

C-1 Possible Bulkhead Service Locations for Small Barge Service

C-2 Possible Pier, Trestle & Buried Pipeline Alignments

C-3 Nut Island Possibilities for Barge Service

C-4 Deer Island Bulkhead Alignment Possibilities for Barge Service

C-5 Deer Island Pier and Trestle Possibilities for Barge Service

C-6 Deer Island Buried Pipeline Possibilities for Barge Service

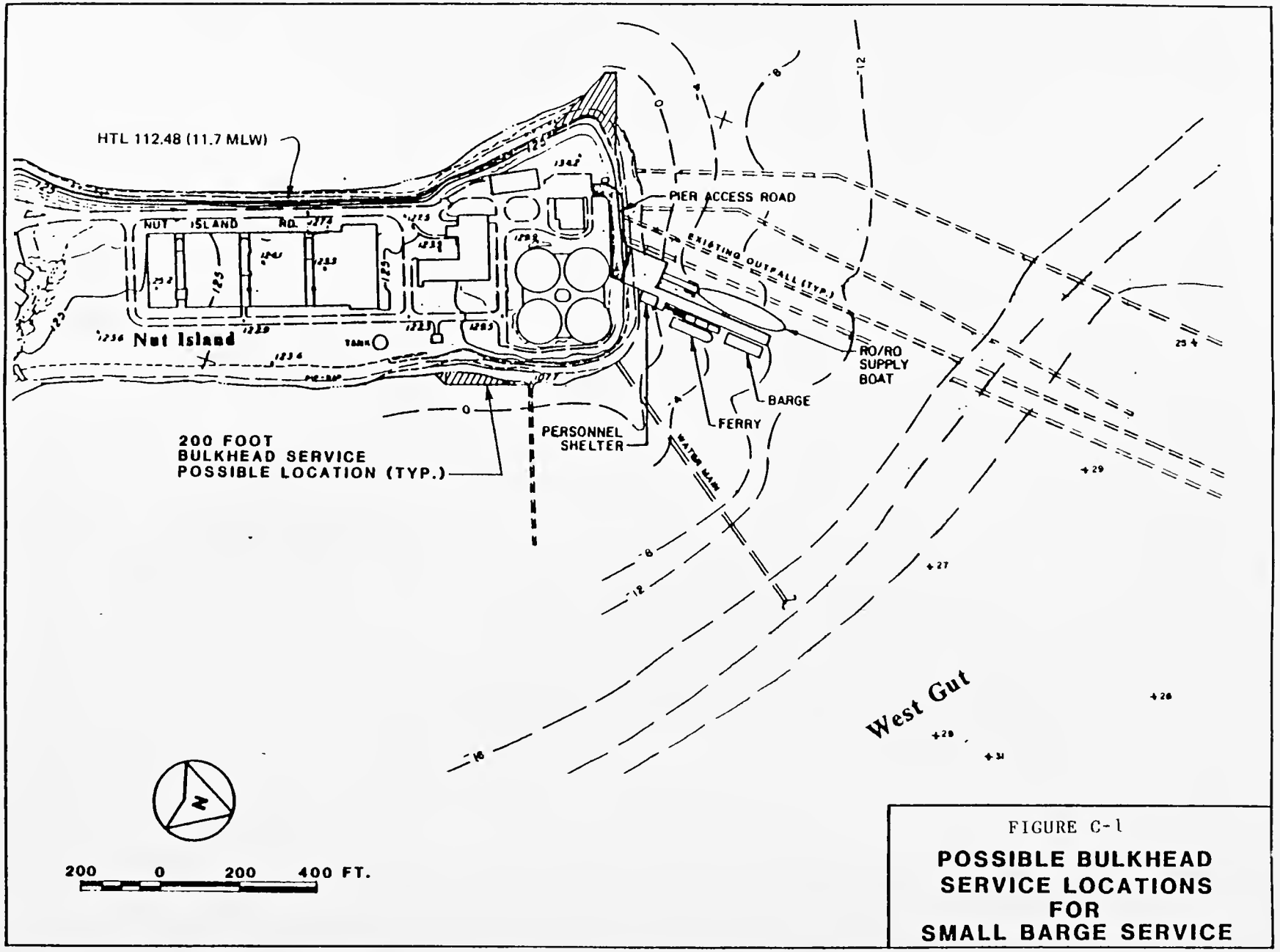


FIGURE C-1

POSSIBLE BULKHEAD SERVICE LOCATIONS FOR SMALL BARGE SERVICE

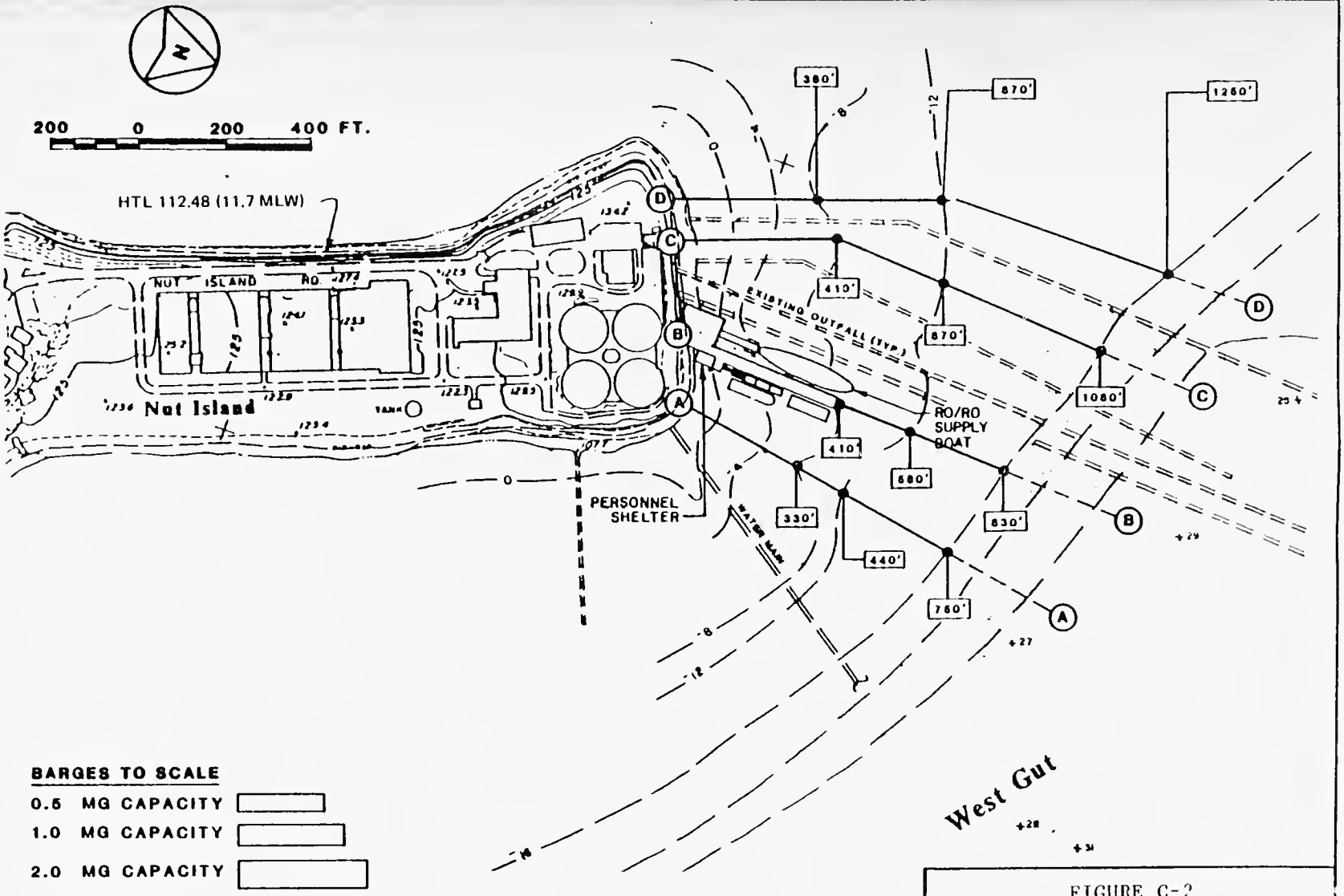
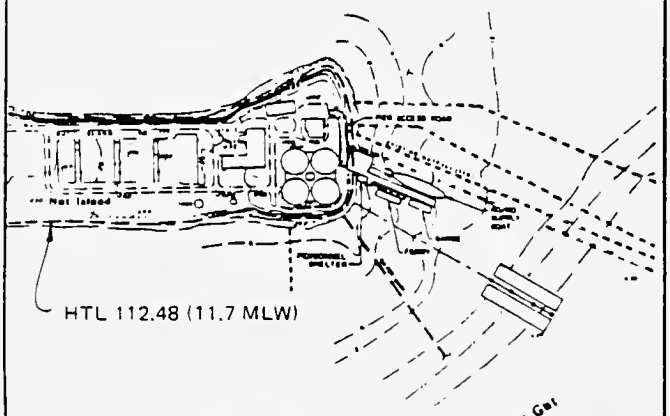


FIGURE C-2

POSSIBLE PIER, TRESTLE & BURIED PIPELINE ALIGNMENTS

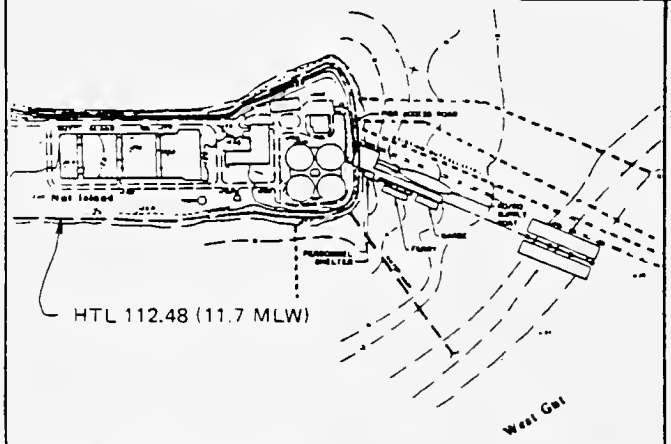
FARSHORE, DREDGE FREE

SEPARATE SERVICE - EASTERLY ALIGNMENT
ALIGNMENT A



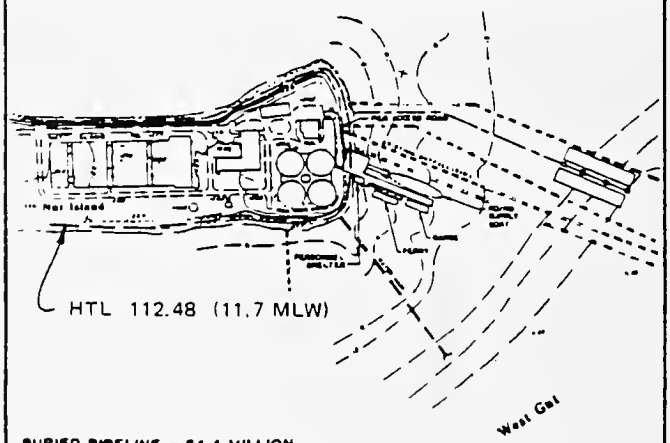
BURIED PIPELINE - $1.0 MILLION
TRESTLE PIPELINE - $1.5 MILLION

COMBINED SERVICE
ALIGNMENT B



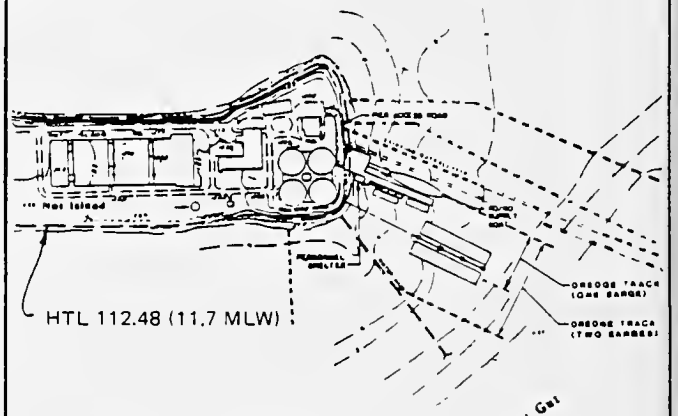
BURIED PIPELINE - $0.8 MILLION
TRESTLE PIPELINE - $1.1 MILLION

SEPARATE SERVICE - WESTERLY ALIGNMENT
ALIGNMENT C

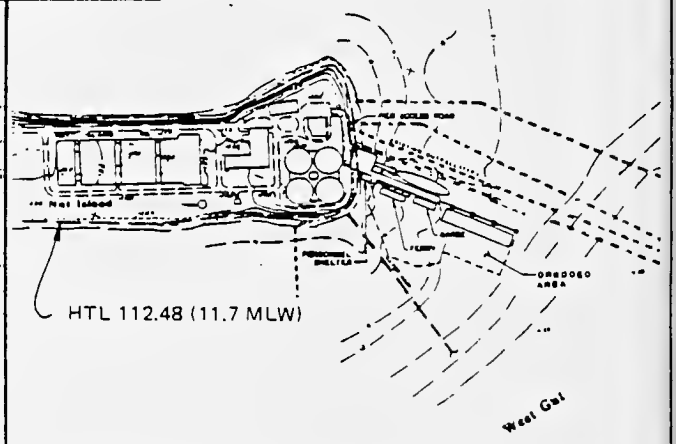


BURIED PIPELINE - $1.4 MILLION
TRESTLE PIPELINE - $2.0 MILLION

NEARSHORE



BURIED PIPELINE - $0.9 TO 1.0 MILLION
TRESTLE PIPELINE - $1.1 TO 1.2 MILLION



ON-ISLAND PIER PIPELINE - $0.8 MILLION

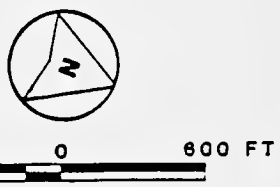
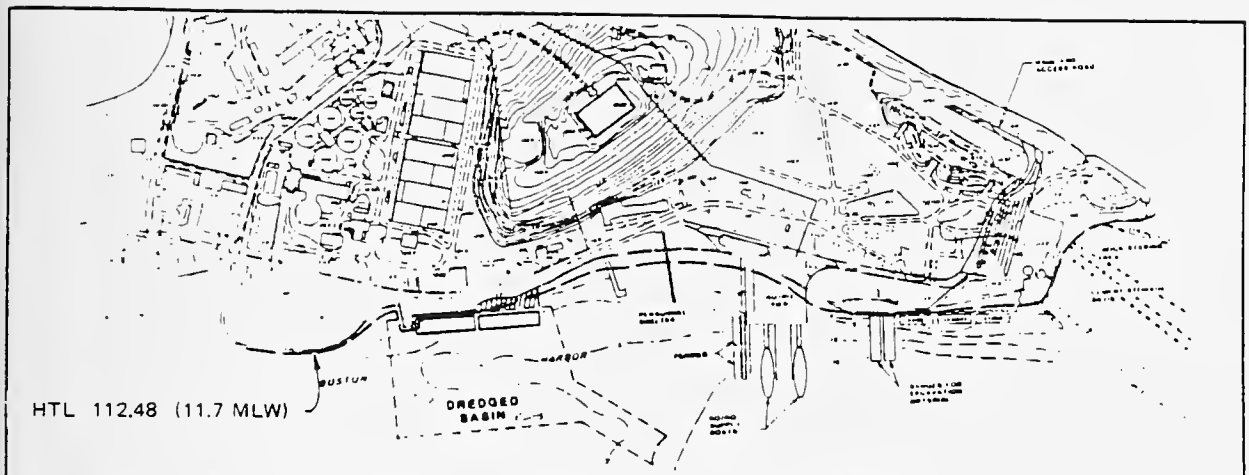
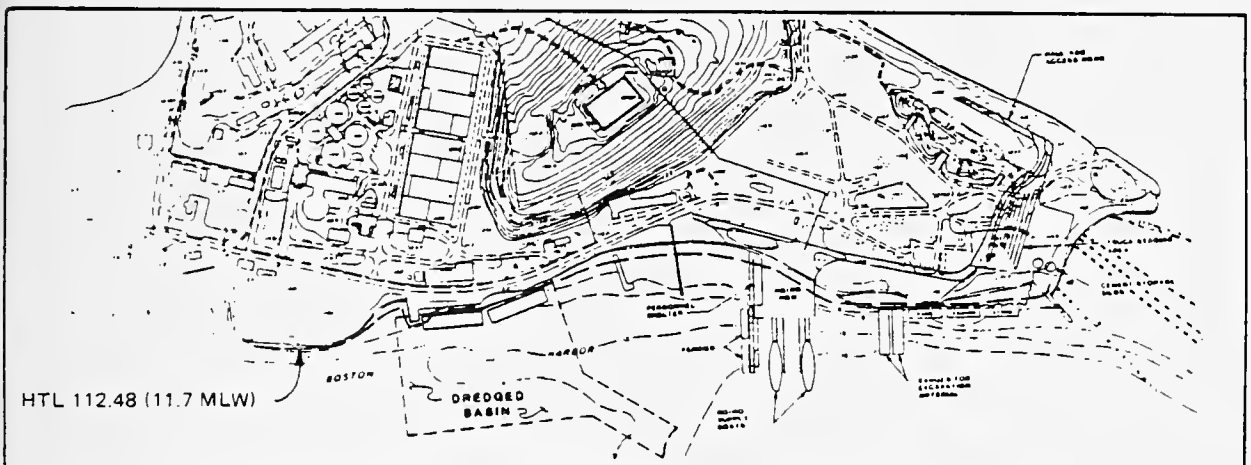


FIGURE C-3

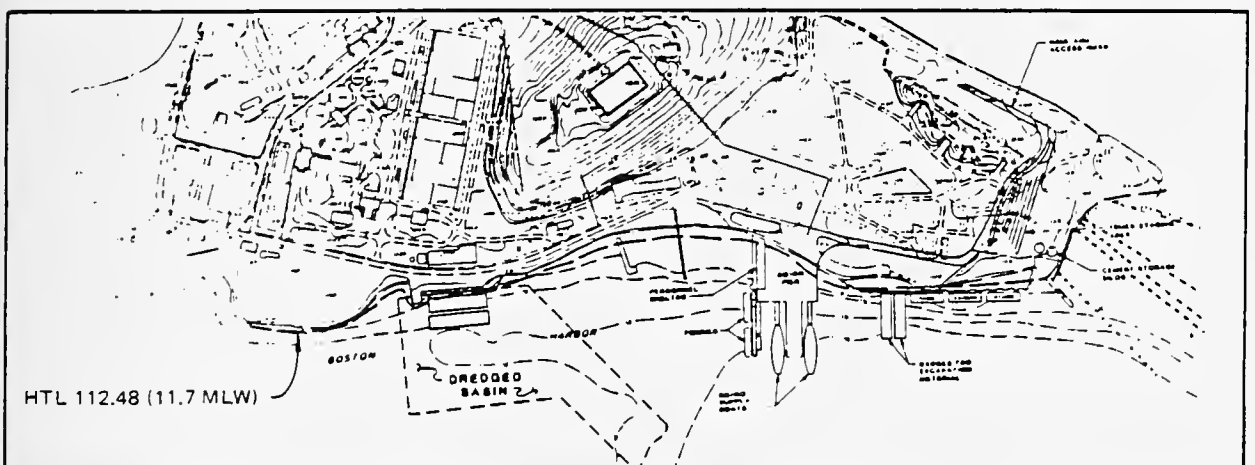
NUT ISLAND POSSIBILITIES FOR BARGE SERVICE



OPTION 1A ($4.5 MILLION): BULKHEAD - BARGE IN SERIES



OPTION 1B ($4.1 MILLION): SLANT BULKHEAD - BARGE IN SERIES



OPTION 1C ($3.1 MILLION): BULKHEAD - PARALLEL BARGE

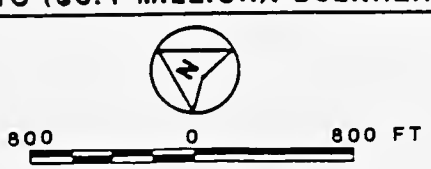
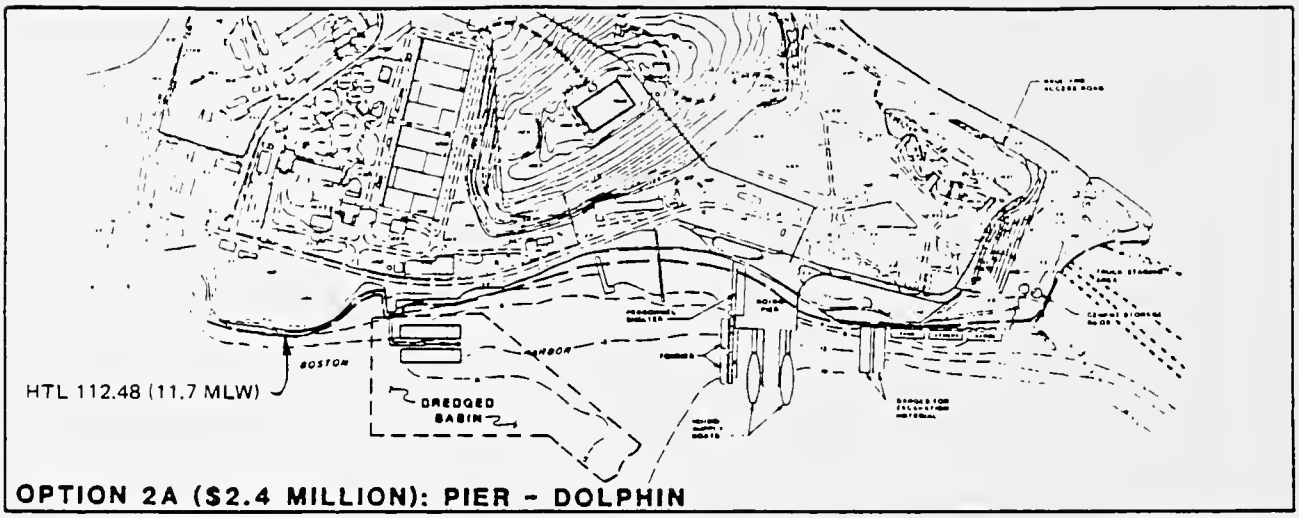
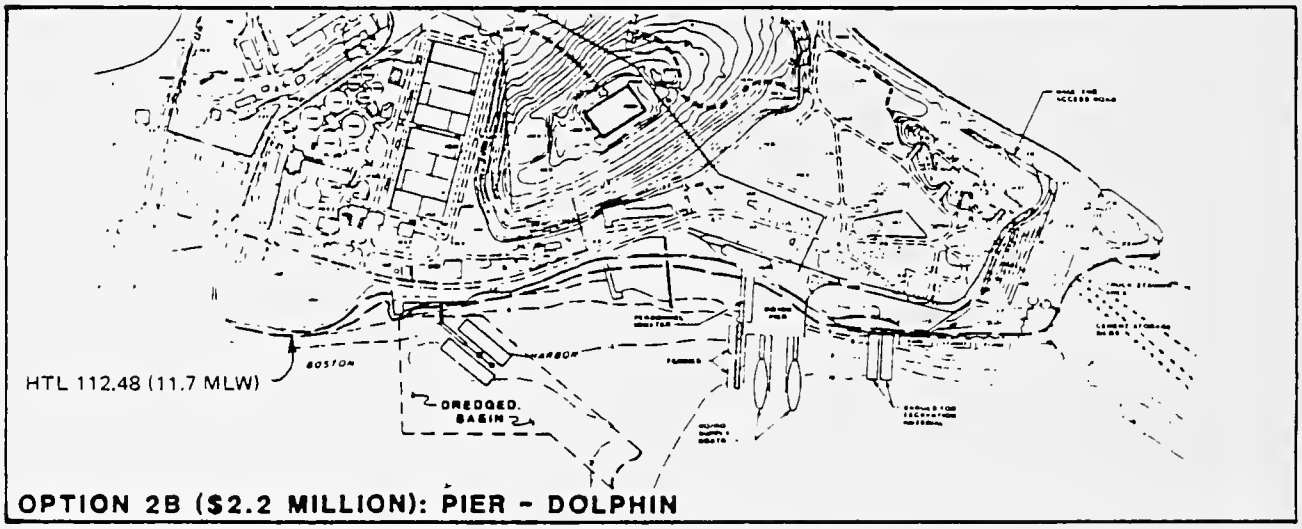


FIGURE C-4

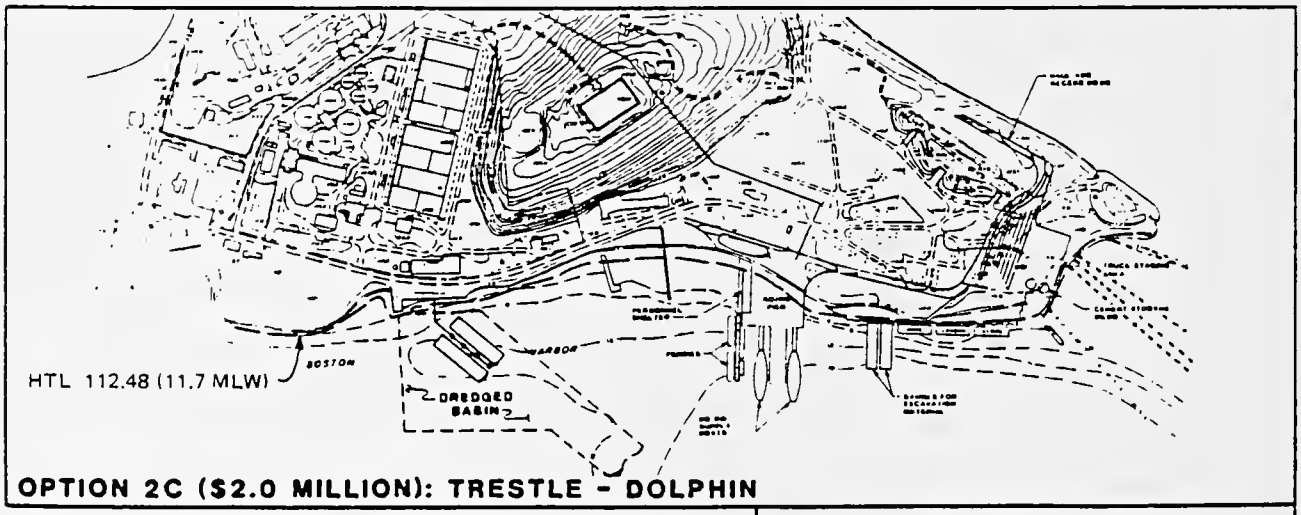
DEER ISLAND BULKHEAD ALIGNMENT POSSIBILITIES FOR BARGE SERVICE



OPTION 2A ($2.4 MILLION): PIER - DOLPHIN



OPTION 2B ($2.2 MILLION): PIER - DOLPHIN



OPTION 2C ($2.0 MILLION): TRESTLE - DOLPHIN

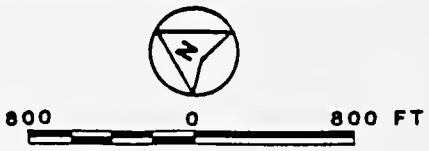
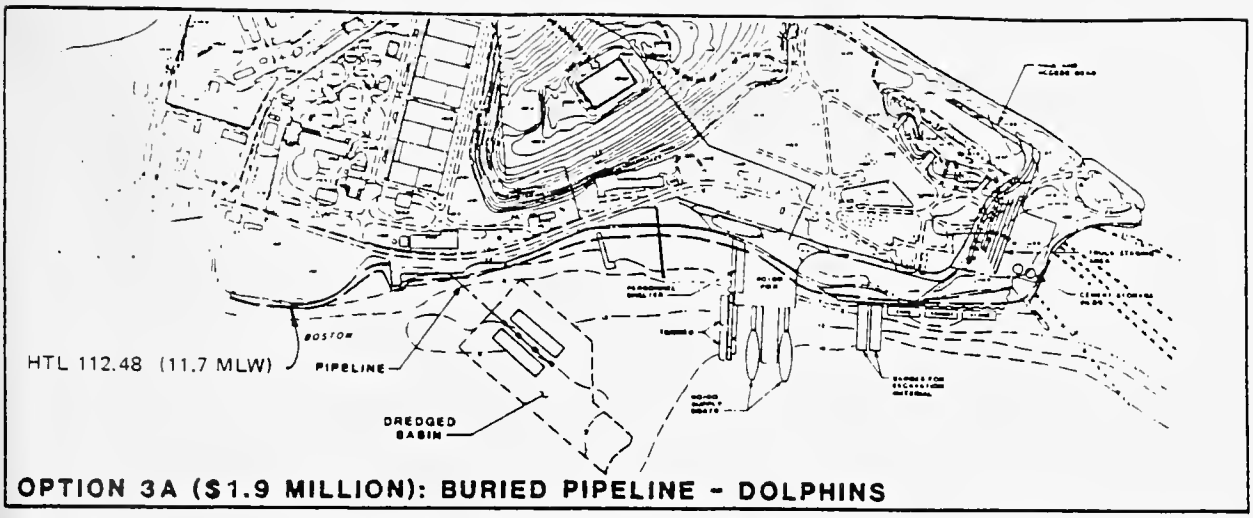
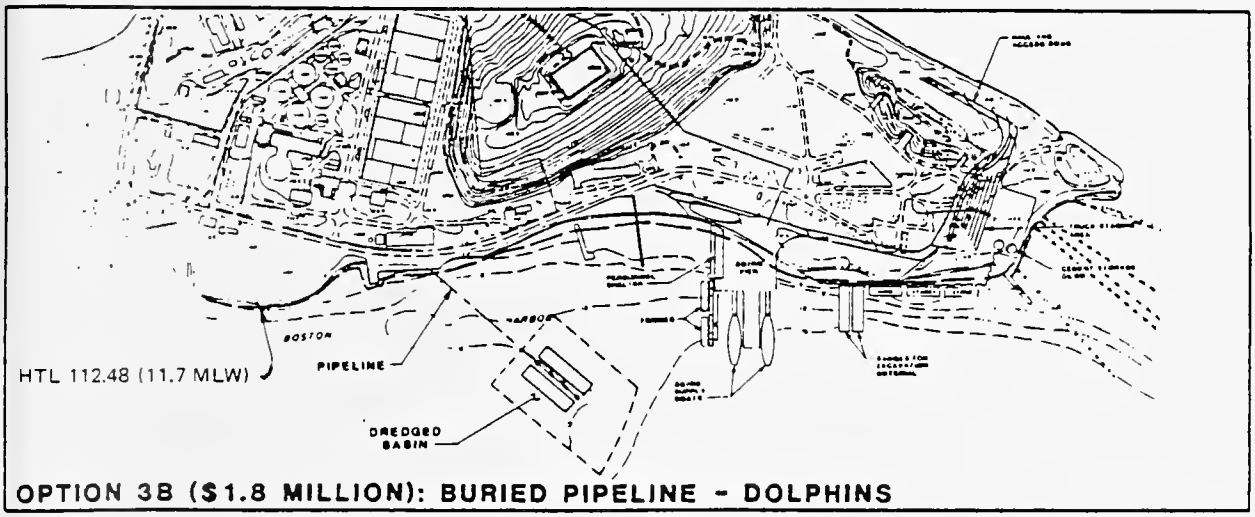


FIGURE C-5

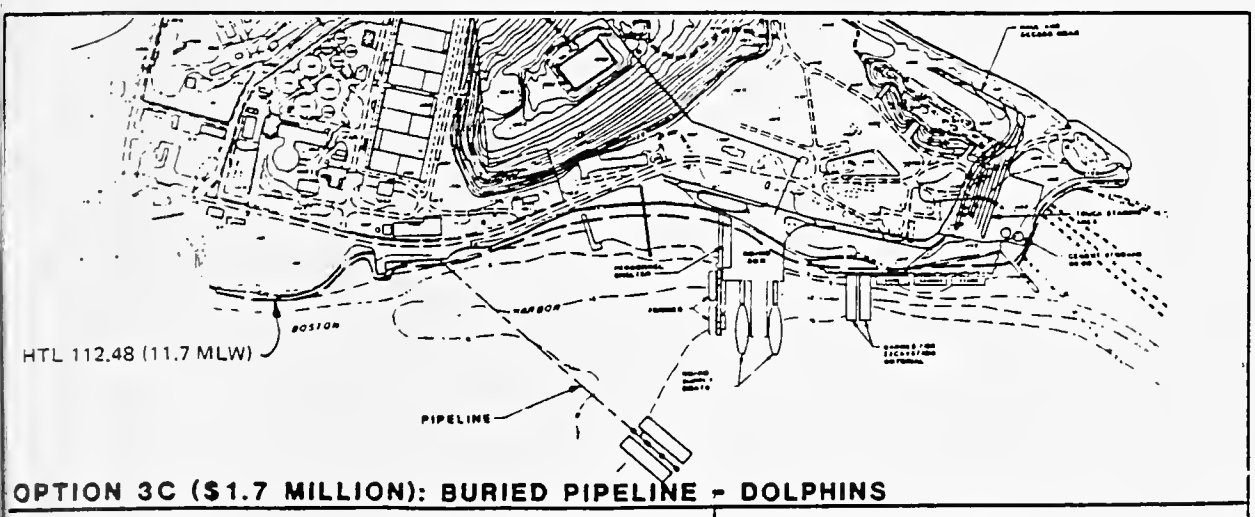
DEER ISLAND PIER AND TRESTLE POSSIBILITIES FOR BARGE SERVICE



OPTION 3A ($1.9 MILLION): BURIED PIPELINE - DOLPHINS



OPTION 3B ($1.8 MILLION): BURIED PIPELINE - DOLPHINS



OPTION 3C ($1.7 MILLION): BURIED PIPELINE - DOLPHINS

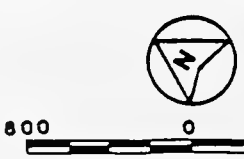


FIGURE C-6

DEER ISLAND BURIED PIPELINE POSSIBILITIES FOR BARGE SERVICE

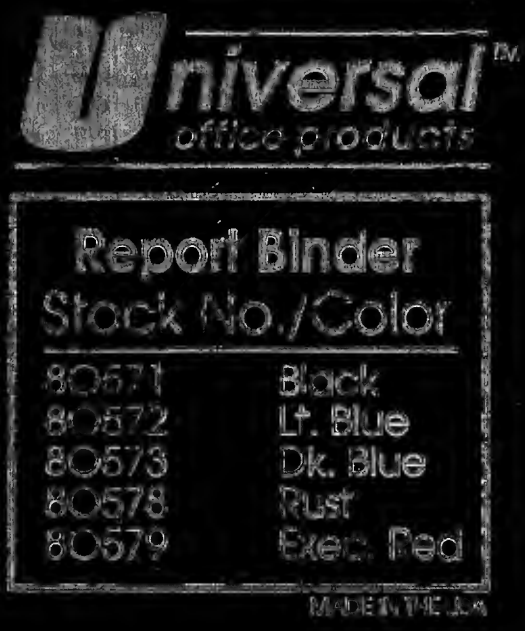
DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 Trapelo Road
Waltham, Massachusetts 02254-9149

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

NEDOD-R

IMPORTANT

This is NOT a circular.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